No Adjacent Sheet

Matchline Sheet 33

Matchline Sheet 36

72

71

Matchline Sheet 37

Legend

Disturbance (1/17/2019)
- Ground Disturbance
- Vegetation/Wetland Type Change, No Ground Disturbance

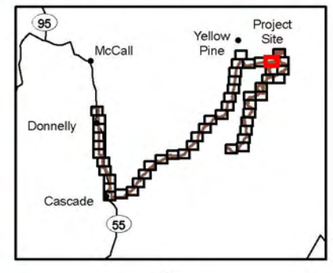
Other Features
- Milepost (for navigation only)
- Existing Road

Delineated Streams* (2/28/2019)
- Perennial

Non-perennial
- Ephemeral
- Intermittent
- Intermittent/Ephemeral

Delineated Wetlands* (4/27/2018)
- Open Water
- Emergent Wetlands
- Forested Wetlands
- Scrub-Shrub Wetlands

*Delineated streams and wetlands that overlap the disturbance footprint are included on figure.



N

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Feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Projection: NAD83 UTM Zone 11N (meter)

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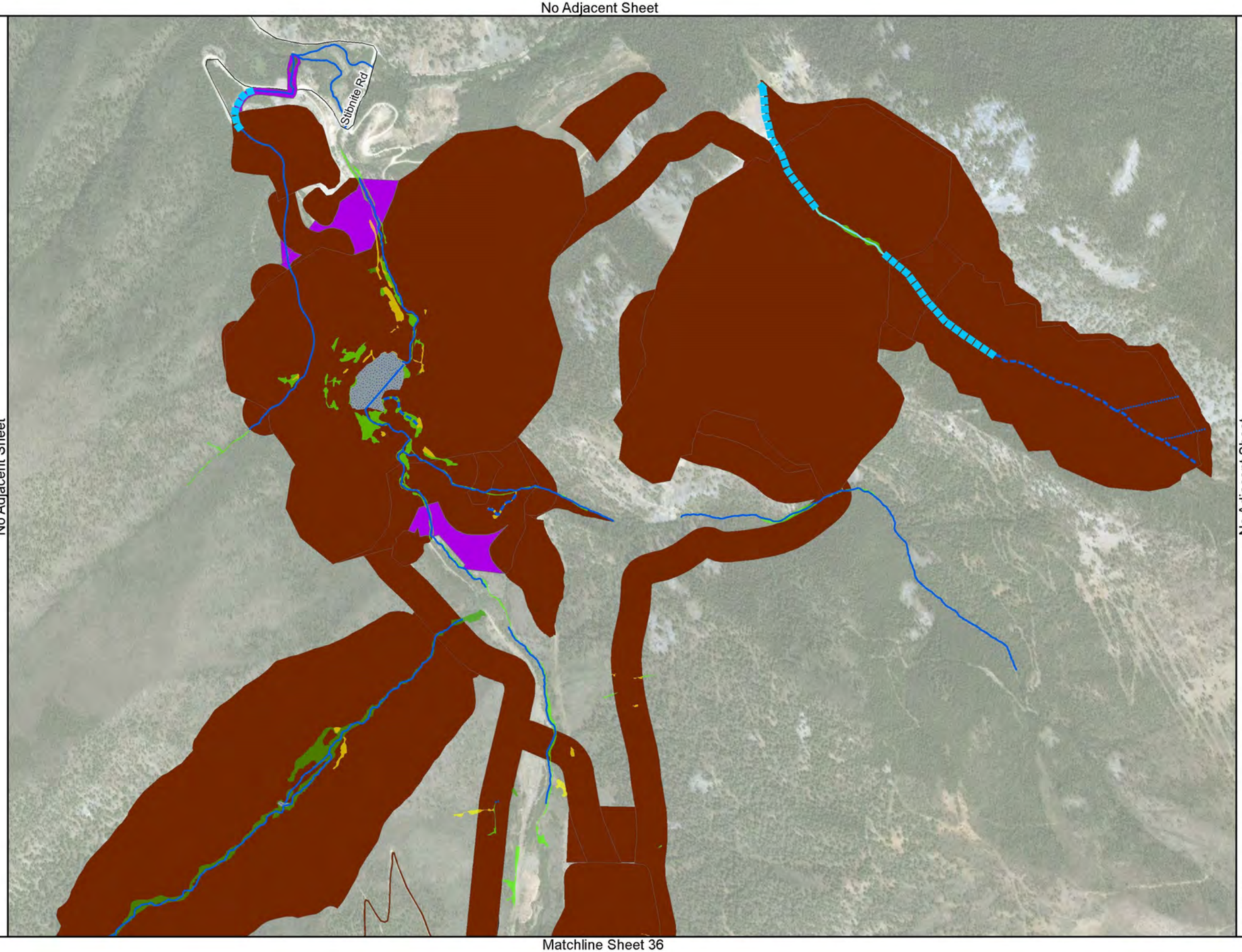
No Adjacent Sheet



No Adjacent Sheet

Legend

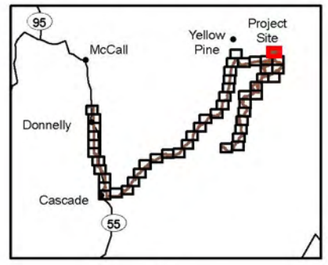
Disturbance (1/17/2019)
- Ground Disturbance
- Project Site - Dewatering, No Ground Disturbance
- Existing Road

Delineated Streams* (2/28/2019)
- Perennial
- N/A Existing Pipe/Culvert

Non-perennial
- Ephemeral
- Intermittent
- Intermittent/Ephemeral

Delineated Wetlands* (4/27/2018)
- Open Water
- Emergent Wetlands
- Forested Wetlands
- Scrub-Shrub Wetlands

*Delineated streams and wetlands that overlap the disturbance footprint are included on figure.



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Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Projection: NAD83 UTM Zone 11N (meter)

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Matchline Sheet 36

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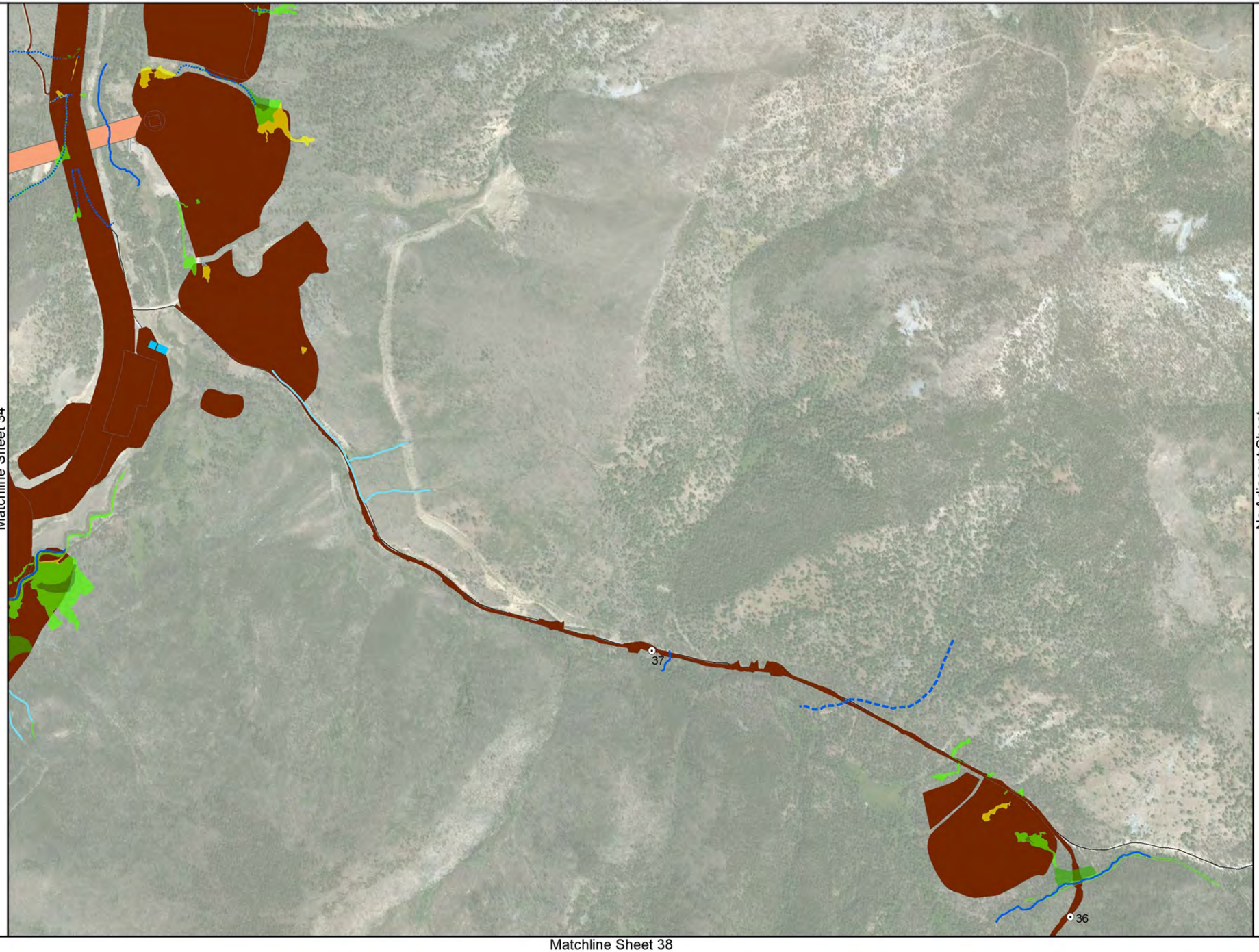
Matchline Sheet 35

Matchline Sheet 34

No Adjacent Sheet



Legend

Disturbance (1/17/2019)
- Ground Disturbance
- Vegetation/Wetland Type Change, No Ground Disturbance

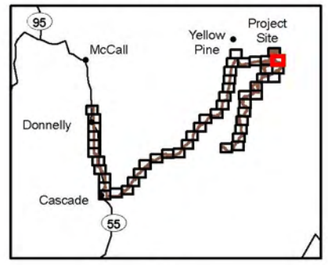
Other Features
- Milepost (for navigation only)
- Existing Road

Delineated Streams* (2/28/2019)
- Perennial
- N/A Existing Pipe/Culvert

Non-perennial
- Ephemeral
- Intermittent
- Intermittent/Ephemeral

Delineated Wetlands* (4/27/2018)
- Open Water
- Emergent Wetlands
- Forested Wetlands
- Scrub-Shrub Wetlands

*Delineated streams and wetlands that overlap the disturbance footprint are included on figure.



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Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Projection: NAD83 UTM Zone 11N (meter)

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Matchline Sheet 38

Matchline Sheet 34

No Adjacent Sheet

Matchline Sheet 38

Matchline Sheet 39

Legend

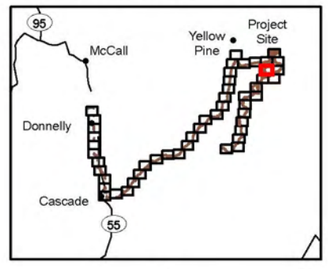
Disturbance (1/17/2019)
- Ground Disturbance

Delineated Streams* (2/28/2019)
- Perennial

Non-perennial
- Ephemeral
- Intermittent
- Intermittent/Ephemeral

Delineated Wetlands* (4/27/2018)
- Emergent Wetlands
- Forested Wetlands
- Scrub-Shrub Wetlands

*Delineated streams and wetlands that overlap the disturbance footprint are included on figure.



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Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Projection: NAD83 UTM Zone 11N (meter)

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Matchline Sheet 36

Matchline Sheet 37

No Adjacent Sheet

35

34

33

Legend

Disturbance (1/17/2019)
- Ground Disturbance

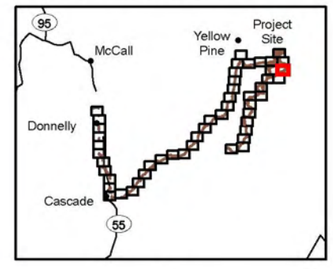
Other Features
- Milepost (for navigation only)

Delineated Streams* (2/28/2019)
- Perennial

Non-perennial
- Ephemeral
- Intermittent

Delineated Wetlands* (4/27/2018)
- Forested Wetlands
- Scrub-Shrub Wetlands

*Delineated streams and wetlands that overlap the disturbance footprint are included on figure.



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Feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Projection: NAD83 UTM Zone 11N (meter)

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Matchline Sheet 39

Matchline Sheet 38

Matchline Sheet 40

No Adjacent Sheet

Legend

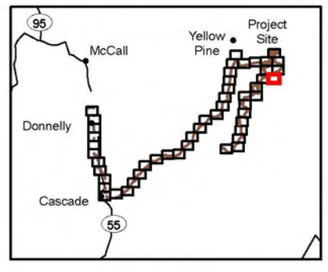
Disturbance (1/17/2019)

Ground Disturbance

Other Features

Milepost (for navigation only)

*Delineated streams and wetlands that overlap the disturbance footprint are included on figure.



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Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Projection: NAD83 UTM Zone 11N (meter)

No Adjacent Sheet

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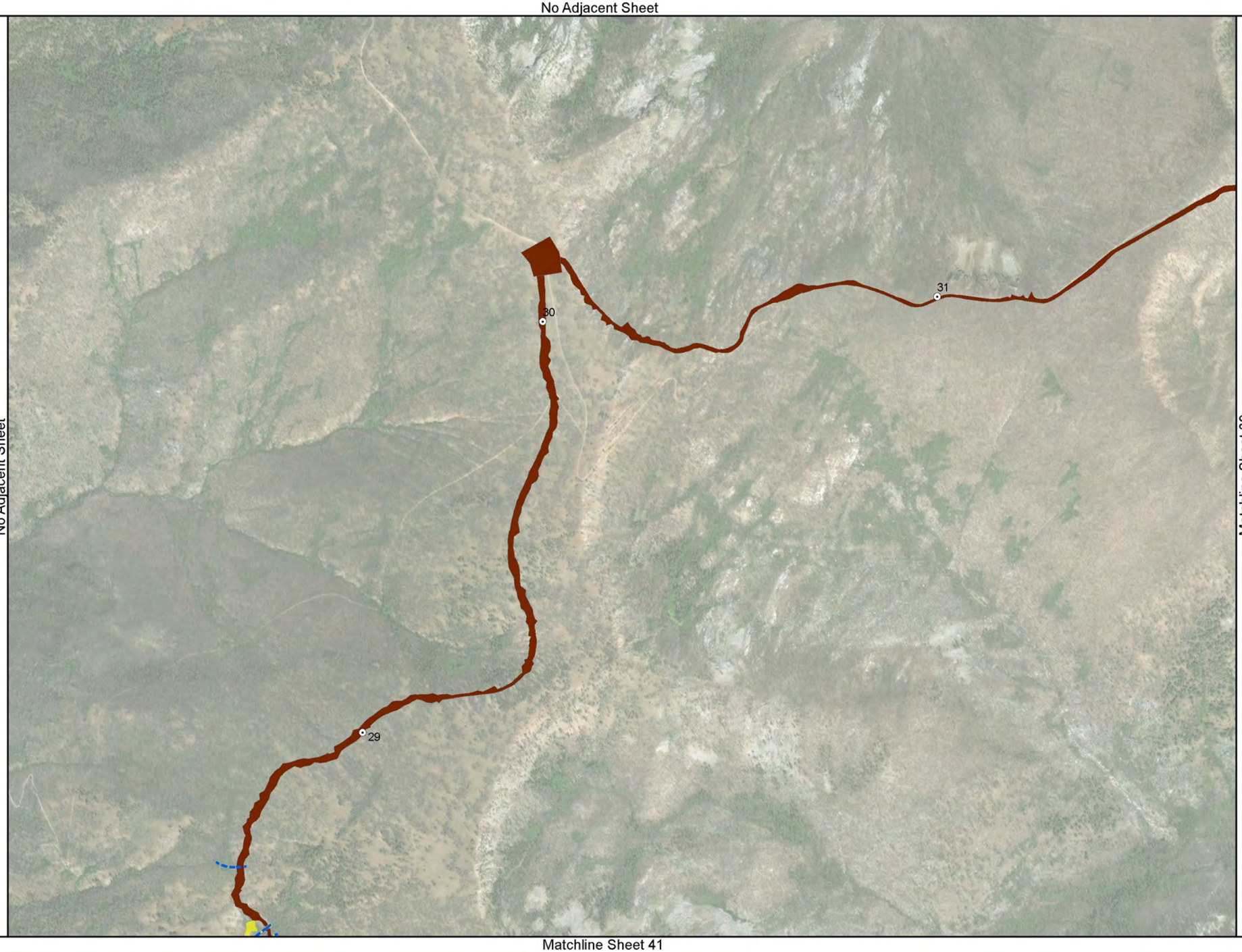
No Adjacent Sheet

No Adjacent Sheet



Matchline Sheet 39

Legend

Disturbance (1/17/2019)
Ground Disturbance

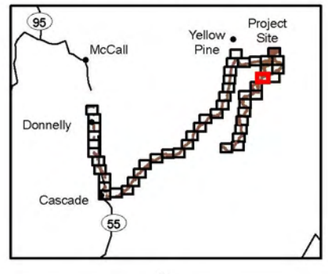
Other Features
Milepost (for navigation only)

Delineated Streams* (2/28/2019)

Non-perennial
Intermittent

Delineated Wetlands* (4/27/2018)
Emergent Wetlands

*Delineated streams and wetlands that overlap the disturbance footprint are included on figure.



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Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Projection: NAD83 UTM Zone 11N (meter)

Matchline Sheet 41

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Matchline Sheet 40

No Adjacent Sheet

25

26

28

27

24

No Adjacent Sheet

Legend

Disturbance (1/17/2019)
- Ground Disturbance

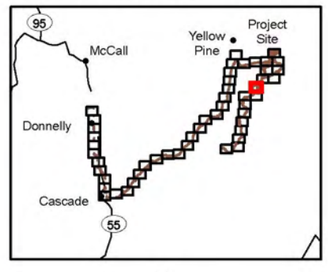
Other Features
- Milepost (for navigation only)

Delineated Streams* (2/28/2019)
- Perennial

Non-perennial
- Intermittent

Delineated Wetlands* (4/27/2018)
- Emergent Wetlands
- Forested Wetlands
- Scrub-Shrub Wetlands

*Delineated streams and wetlands that overlap the disturbance footprint are included on figure.



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Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Projection: NAD83 UTM Zone 11N (meter)

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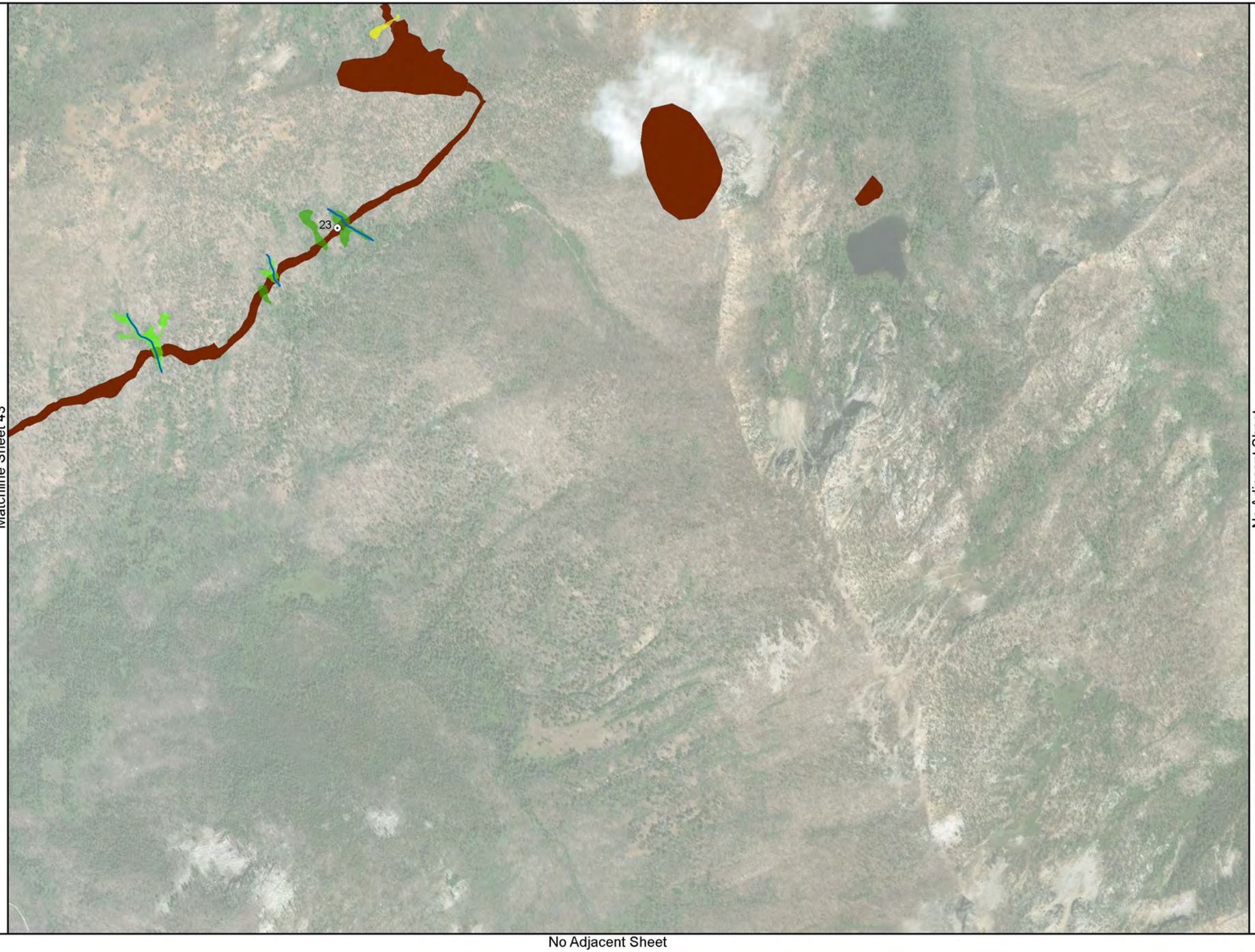
Matchline Sheet 42

Matchline Sheet 41



Matchline Sheet 43

No Adjacent Sheet

Legend

Disturbance (1/17/2019)
- Ground Disturbance

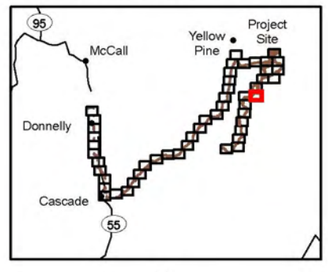
Other Features
- Milepost (for navigation only)

Delineated Streams* (2/28/2019)
- Perennial

Delineated Wetlands* (4/27/2018)
- Emergent Wetlands
- Forested Wetlands
- Scrub-Shrub Wetlands

No Adjacent Sheet

*Delineated streams and wetlands that overlap the disturbance footprint are included on figure.



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Feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Projection: NAD83 UTM Zone 11N (meter)

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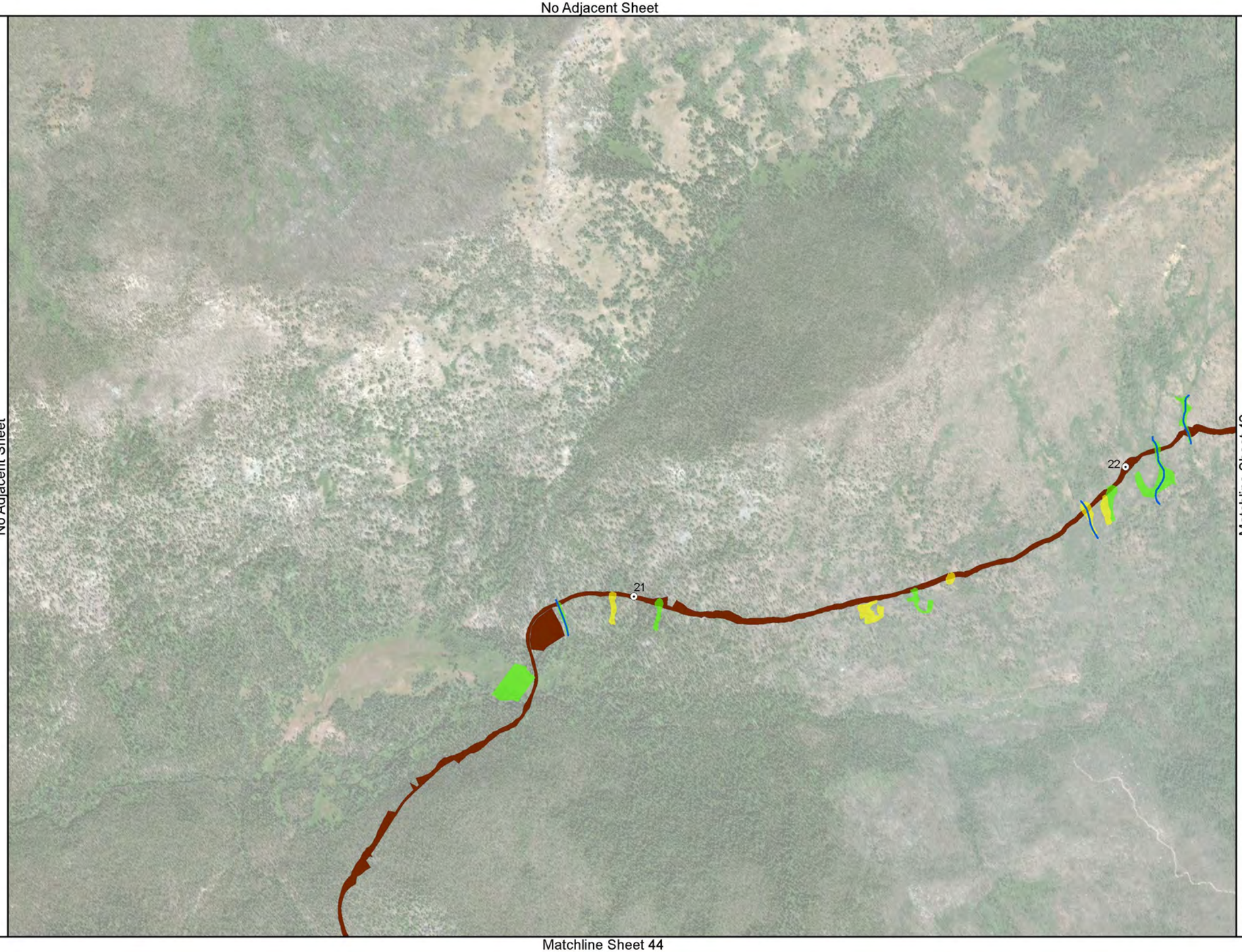
No Adjacent Sheet

Sheet 42 of 50

No Adjacent Sheet

No Adjacent Sheet



Matchline Sheet 42

Legend

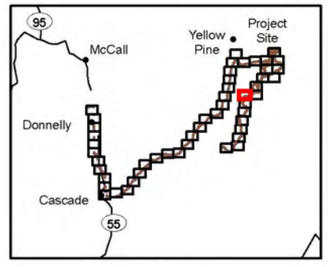
Disturbance (1/17/2019)
- Ground Disturbance

Other Features
- Milepost (for navigation only)

Delineated Streams* (2/28/2019)
- Perennial

Delineated Wetlands* (4/27/2018)
- Emergent Wetlands
- Scrub-Shrub Wetlands

*Delineated streams and wetlands that overlap the disturbance footprint are included on figure.



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Feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Projection: NAD83 UTM Zone 11N (meter)

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Matchline Sheet 44

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Matchline Sheet 43

No Adjacent Sheet

20

19

18

Burntlog Rd NF-447

No Adjacent Sheet

Legend

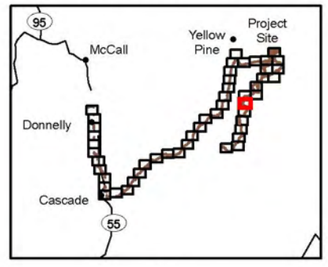
Disturbance (1/17/2019)
- Ground Disturbance

Other Features
- Milepost (for navigation only)
- Existing Road

Delineated Streams* (2/28/2019)
- Perennial
- N/A Existing Pipe/Culvert

Delineated Wetlands* (4/27/2018)
- Emergent Wetlands
- Forested Wetlands
- Scrub-Shrub Wetlands

*Delineated streams and wetlands that overlap the disturbance footprint are included on figure.



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Feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Projection: NAD83 UTM Zone 11N (meter)

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Matchline Sheet 45

Matchline Sheet 44

No Adjacent Sheet

No Adjacent Sheet

Burntlog Rd NF-447

17

16

14

Burntlog Rd NF-447

Burntlog Rd NF-447

Legend

Disturbance (1/17/2019)
- Ground Disturbance

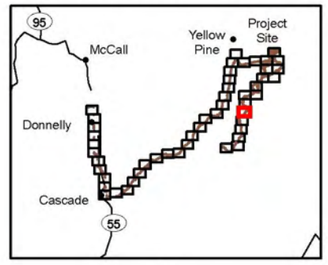
Other Features
- Milepost (for navigation only)
- Existing Road

Delineated Streams* (2/28/2019)
- Perennial
- N/A Existing Pipe/Culvert

Non-perennial
- Ephemeral
- Intermittent

Delineated Wetlands* (4/27/2018)
- Emergent Wetlands
- Scrub-Shrub Wetlands

*Delineated streams and wetlands that overlap the disturbance footprint are included on figure.



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Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Projection: NAD83 UTM Zone 11N (meter)

Matchline Sheet 46

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Matchline Sheet 45

No Adjacent Sheet

No Adjacent Sheet

Burntlog Rd NF-447

Burntlog Rd NF-447

Burntlog Rd NF-447

15

13

12

11

Legend

Disturbance (1/17/2019)
- Ground Disturbance

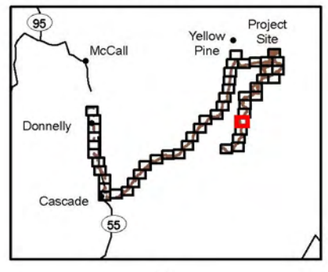
Other Features
- Milepost (for navigation only)
- Existing Road

Delineated Streams* (2/28/2019)
- N/A Existing Pipe/Culvert

Non-perennial
- Ephemeral
- Intermittent

Delineated Wetlands* (4/27/2018)
- Emergent Wetlands
- Scrub-Shrub Wetlands

*Delineated streams and wetlands that overlap the disturbance footprint are included on figure.



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Feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Projection: NAD83 UTM Zone 11N (meter)

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Matchline Sheet 47

Matchline Sheet 46

No Adjacent Sheet

10

9

Burnt Log Rd NF-447

8

No Adjacent Sheet

Legend

Disturbance (1/17/2019)
- Ground Disturbance

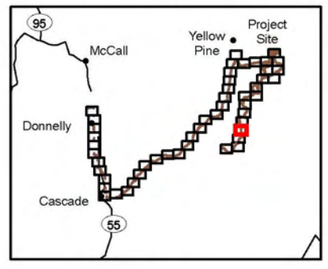
Other Features
- Milepost (for navigation only)
- Existing Road

Delineated Streams* (2/28/2019)
- Perennial
- N/A Existing Pipe/Culvert

Non-perennial
- Ephemeral
- Intermittent

Delineated Wetlands* (4/27/2018)
- Emergent Wetlands
- Scrub-Shrub Wetlands

*Delineated streams and wetlands that overlap the disturbance footprint are included on figure.



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Feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Projection: NAD83 UTM Zone 11N (meter)

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Matchline Sheet 48

Matchline Sheet 47

No Adjacent Sheet

Burntlog Rd/NF-447

5

6

7

No Adjacent Sheet

Legend

Disturbance (1/17/2019)
- Ground Disturbance

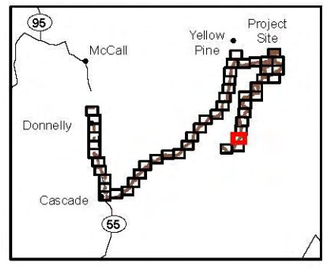
Other Features
- Milepost (for navigation only)
- Existing Road

Delineated Streams* (2/28/2019)
- Perennial
- N/A Existing Pipe/Culvert

Non-perennial
- Ephemeral
- Intermittent

Delineated Wetlands* (4/27/2018)
- Emergent Wetlands
- Forested Wetlands

*Delineated streams and wetlands that overlap the disturbance footprint are included on figure.



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Feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Projection: NAD83 UTM Zone 11N (meter)

Matchline Sheet 49

Matchline Sheet 48

Matchline Sheet 50

No Adjacent Sheet

4

3

Burntlog Rd/NF-447

Legend

Disturbance (1/17/2019)
- Ground Disturbance

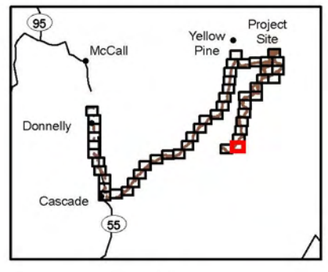
Other Features
- Milepost (for navigation only)
- Existing Road

Delineated Streams* (2/28/2019)
- N/A Existing Pipe/Culvert

Non-perennial
- Ephemeral
- Intermittent

Delineated Wetlands* (4/27/2018)
- Emergent Wetlands
- Scrub-Shrub Wetlands

*Delineated streams and wetlands that overlap the disturbance footprint are included on figure.



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Feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Projection: NAD83 UTM Zone 11N (meter)

No Adjacent Sheet

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No Adjacent Sheet

No Adjacent Sheet

Matchline Sheet 49

Johnson Creek Rd

Landmark

0

1

2

Landmark Stanley Rd

Burntlog Rd NF-447

Legend

Disturbance (1/17/2019)
- Ground Disturbance

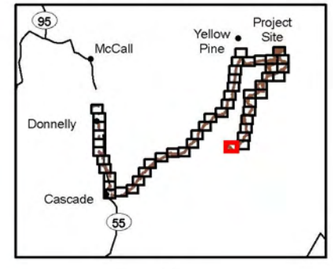
Other Features
- Milepost (for navigation only)
- Existing Road

Delineated Streams* (2/28/2019)
- Perennial
- N/A Existing Pipe/Culvert

Non-perennial
- Intermittent

Delineated Wetlands* (4/27/2018)
- Emergent Wetlands
- Forested Wetlands
- Scrub-Shrub Wetlands

*Delineated streams and wetlands that overlap the disturbance footprint are included on figure.



N

0 2,000

Feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

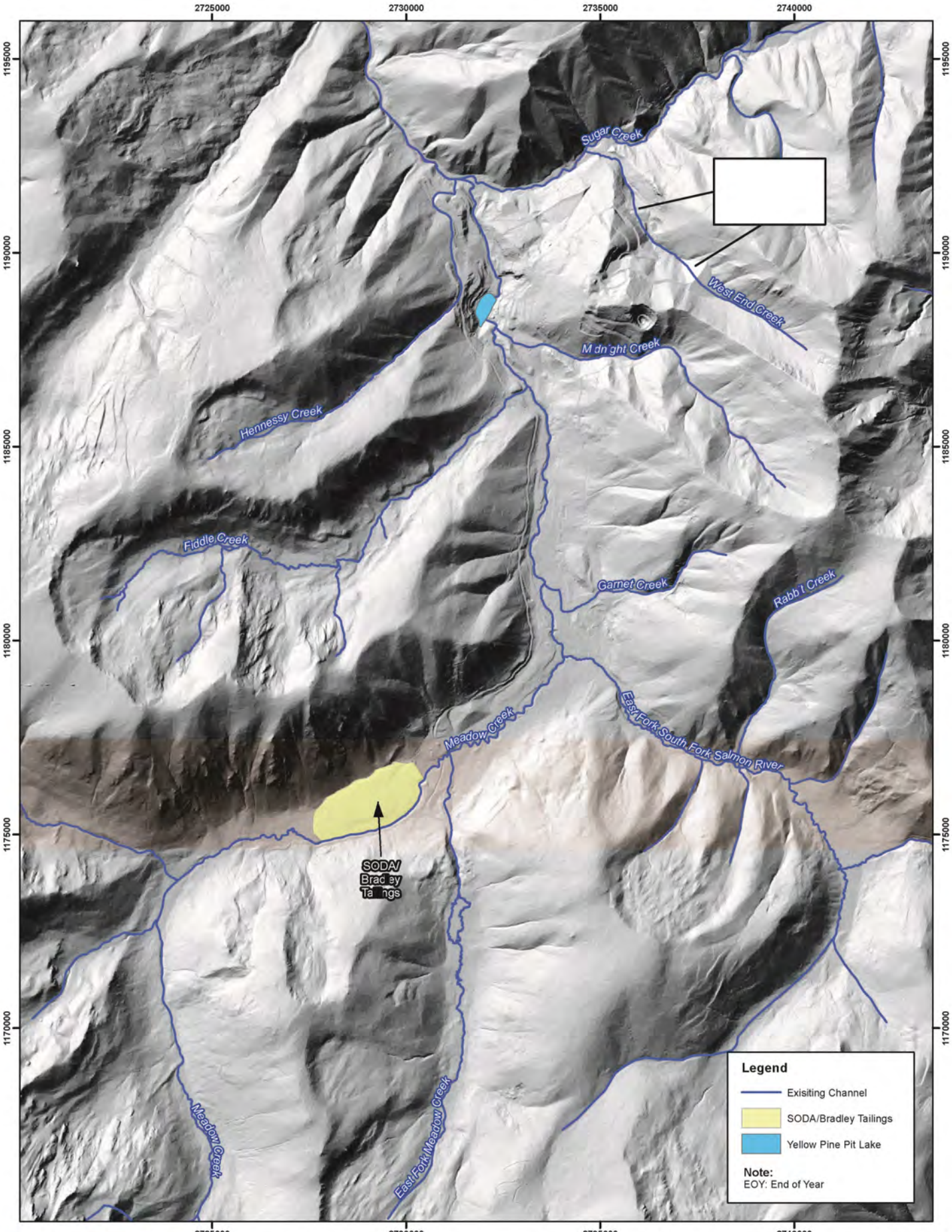
Projection: NAD83 UTM Zone 11N (meter)

No Adjacent Sheet

Sheet 50 of 50

Z:\MineServ\Midas\Stibnite\Report\03_02_Conceptual_Mitigation_Plan\20181123_Response_to_Agency_Comments_Internal_Deliverable\Figures\Appendix_B_Offsite_Stream_Wetland_Impacts_inPD.mxd patricia.williams 3/25/2019

Appendix C: Conceptual Yearly Development Figures



Brown AND Caldwell

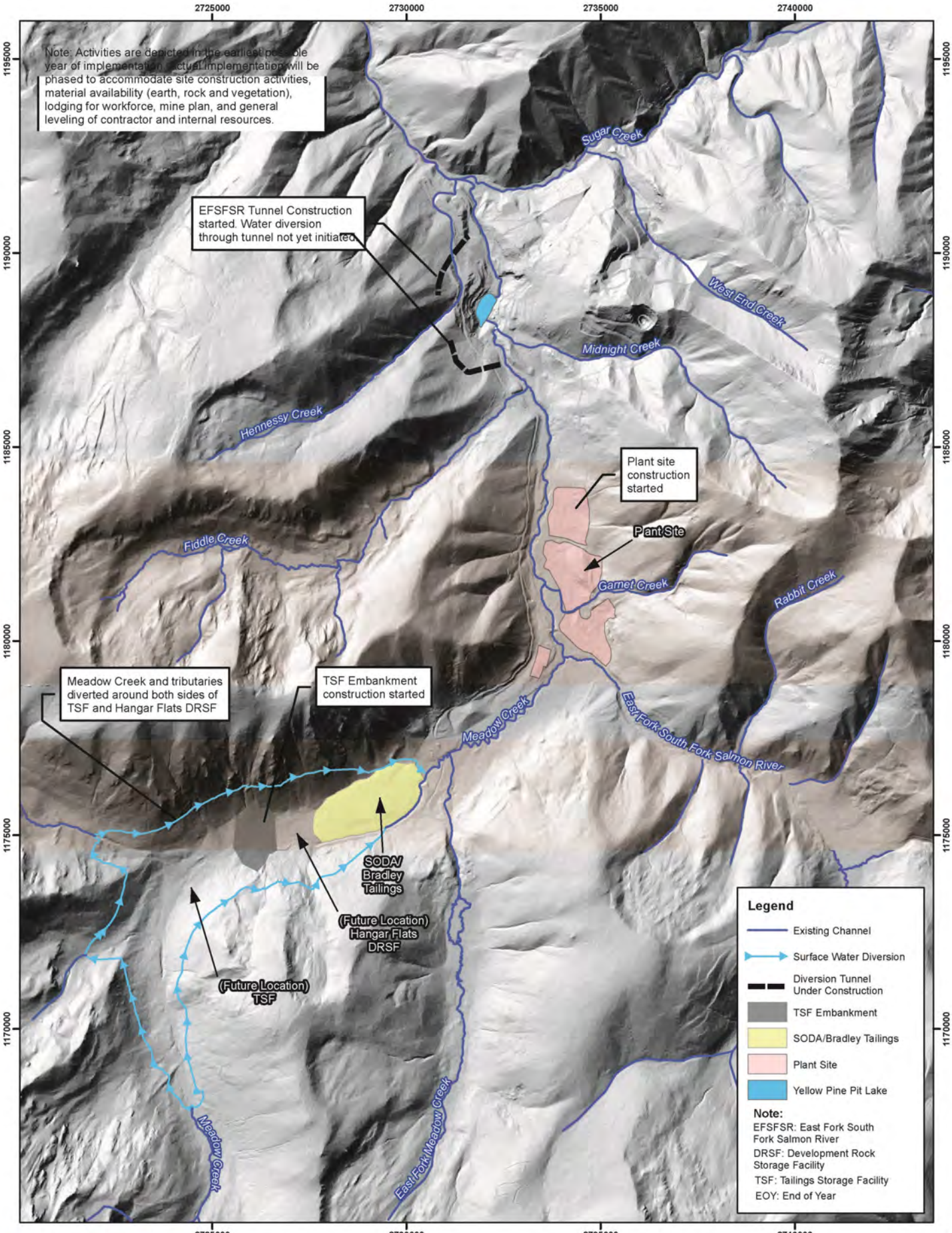
Date: 3/19/2018
Project No: 151586
Client: Midas Gold

0 0.25 0.5 1 Miles

N

Figure A1 - EOY -3
Site-Wide Water Balance
Stibnite Gold Project

Path: Bcbo\\P:_Midas Gold\GIS\RFAIs\RFAI-57 - Stream Management\MXDs\SiteWideWaterBalance_20180309\EOY_Streams_Neg3_20180313.mxd



Brown AND Caldwell

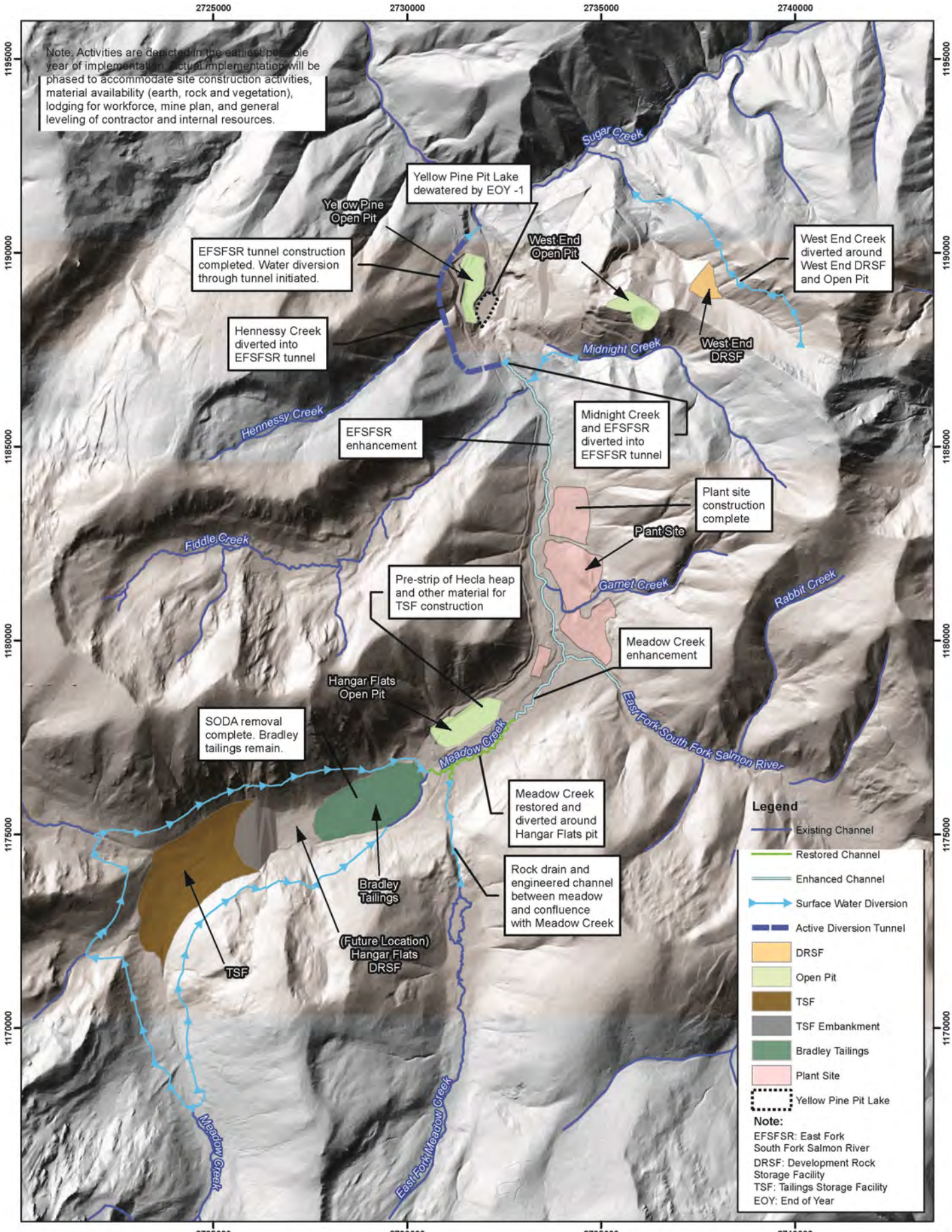
Date: 3/19/2018
Project No: 151586
Client: Midas Gold

0 0.25 0.5 1 Miles

N

Figure A2 - EOY -2
Site-Wide Water Balance
Stibnite Gold Project

Path: Bcbo\P:_Midas Gold\GIS\RFAIs\RFAI-57 - Stream Management\MXDs\SiteWideWaterBalance_20180309\EOY_Streams_Neg2_20180313.mxd



Brown AND Caldwell

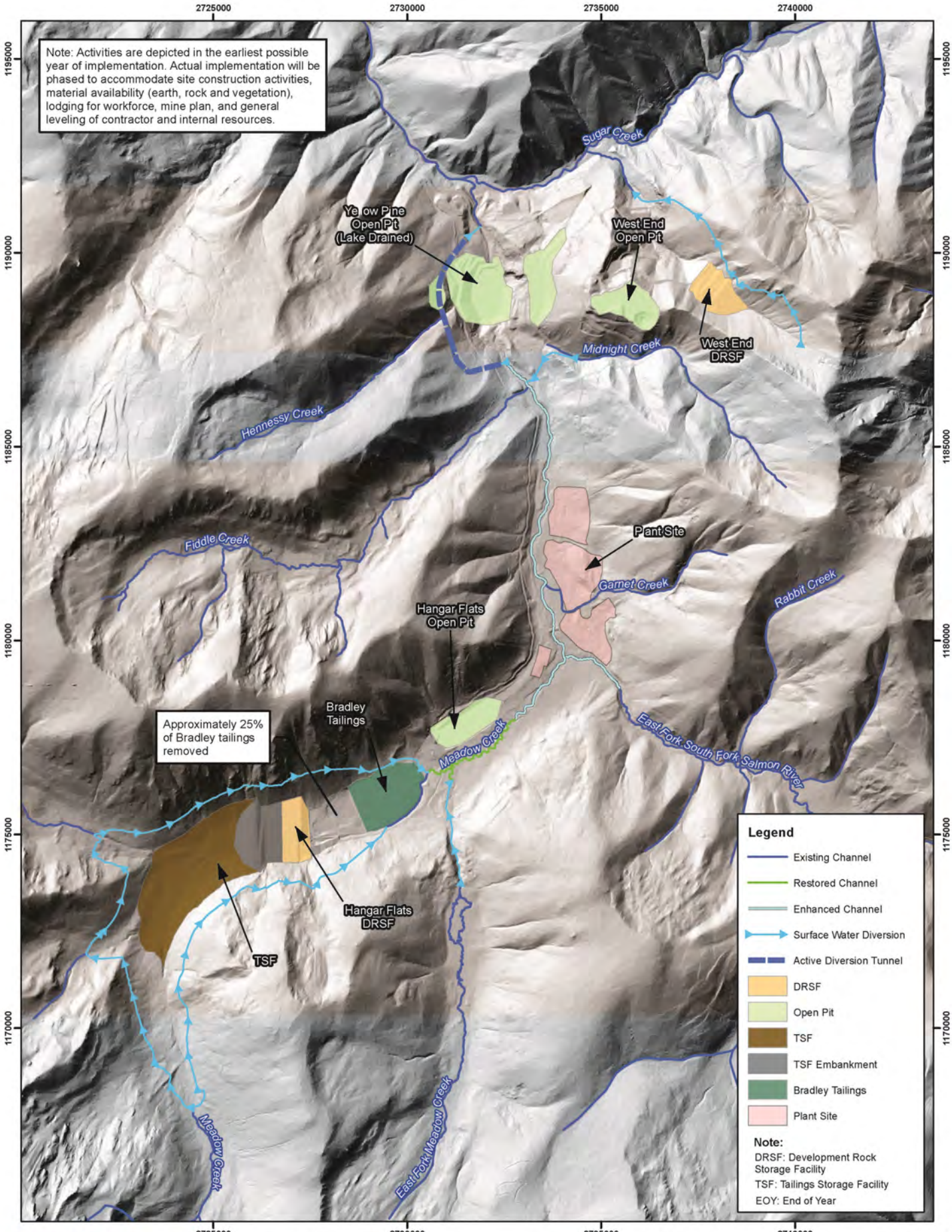
Date: 3/20/2018
Project No: 151586
Client: Midas Gold

0 0.25 0.5 1 Miles

N

Figure A3 - EOY -1
Site-Wide Water Balance
Stibnite Gold Project

Path: Bcbo\P:_Midas Gold\GIS\RFAIs\RFAI-57 - Stream Management\MXDs\SiteWideWaterBalance_20180309\EOY_Streams_Neg1_20180313.mxd



Brown AND Caldwell

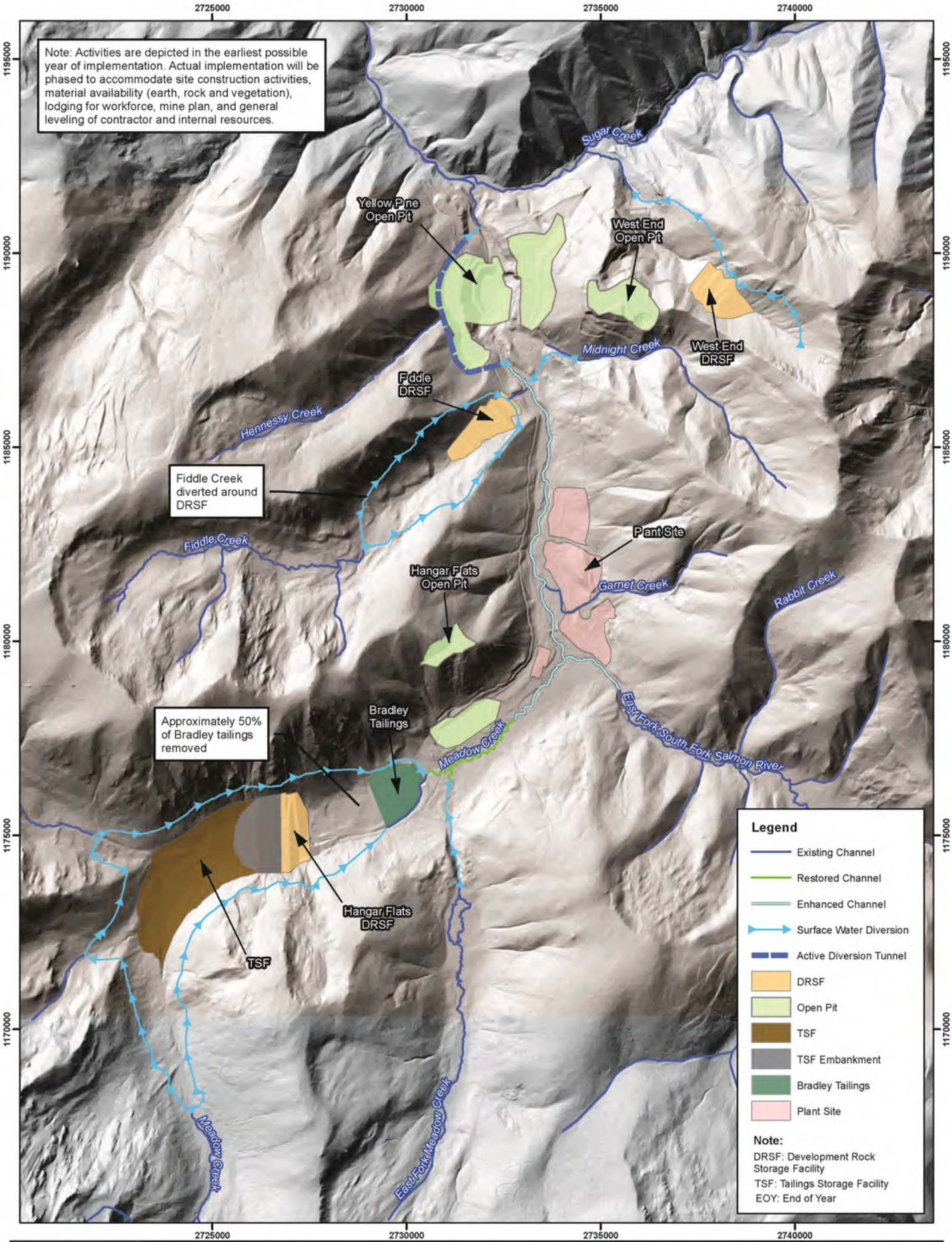
Date: 3/19/2018
Project No: 151586
Client: Midas Gold

0 0.25 0.5 1 Miles

N

Figure A4 - EOY 1
Site-Wide Water Balance
Stibnite Gold Project

Path: Bcbo\P:_Midas Gold\GIS\RFAIs\RFAI-57 - Stream Management\MXDs\SiteWideWaterBalance_20180309\EOY_Streams_1_20180313.mxd



Brown AND Caldwell

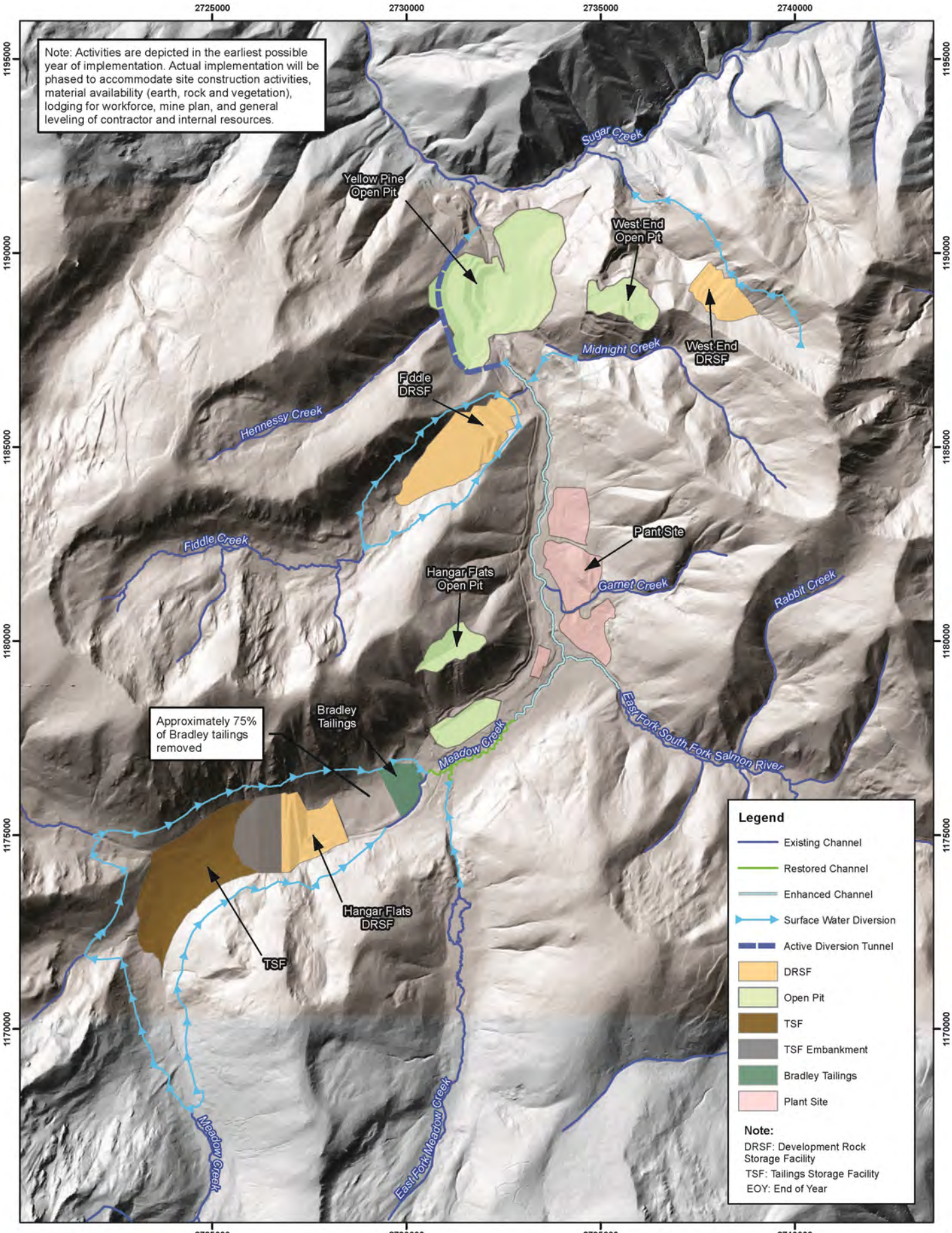
Date: 3/19/2018
Project No: 151586
Client: Midas Gold

0 0.25 0.5 1 Miles

N

Figure A5 - EOY 2
Site-Wide Water Balance
Stibnite Gold Project

Path: Bcbol\P:_Midas Gold\GIS\RFAIs\RFAI-57 - Stream Management\MXDs\SiteWideWaterBalance_20180309\EOY_Streams_2_20180313.mxd



Brown AND Caldwell

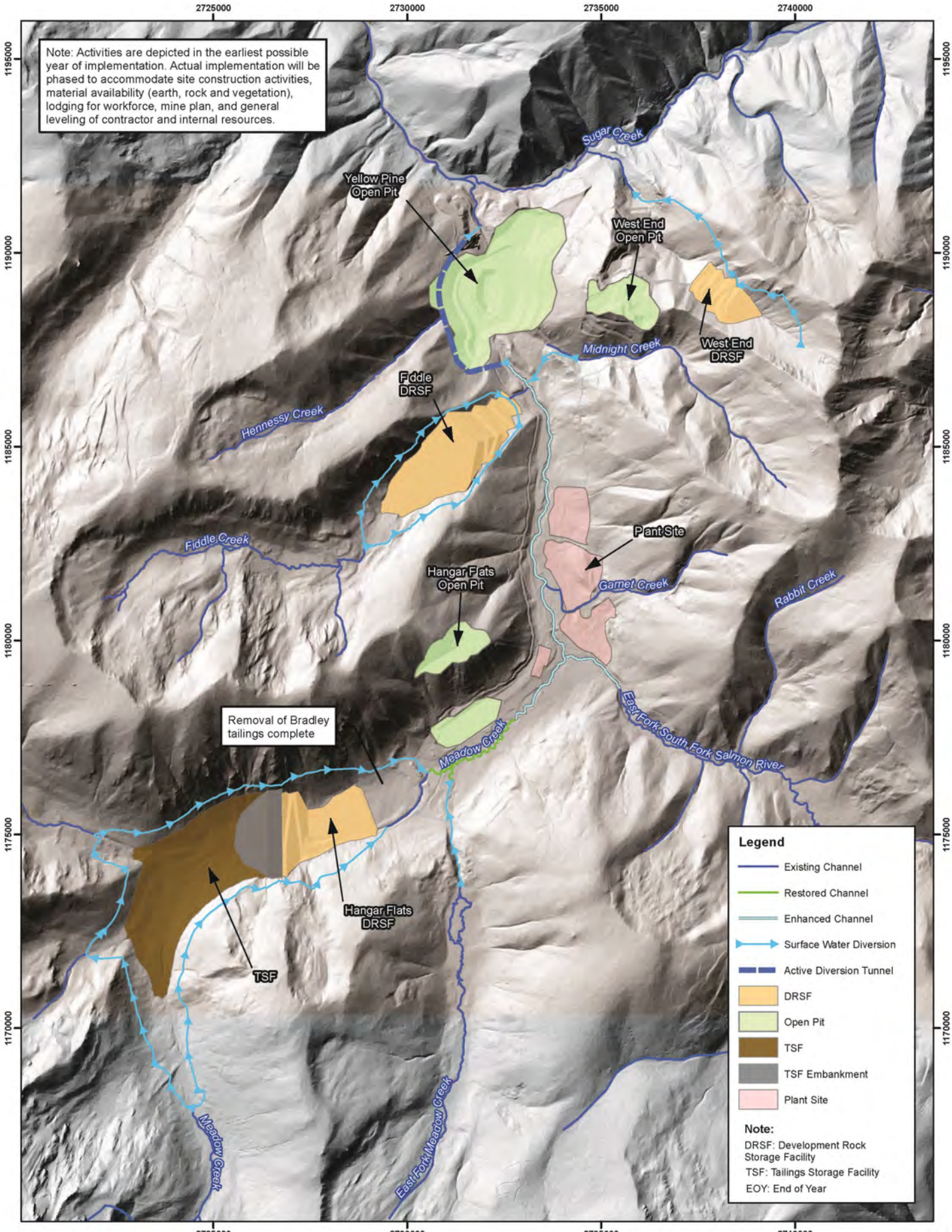
Date: 3/19/2018
Project No: 151586
Client: Midas Gold

0 0.25 0.5 1 Miles

N

Figure A6 - EOY 3
Site-Wide Water Balance
Stibnite Gold Project

Path: Bcbo\P:_Midas Gold\GIS\RFAIs\RFAI-57 - Stream Management\MXDs\SiteWideWaterBalance_20180309\EOY_Streams_3_20180313.mxd



Brown AND Caldwell

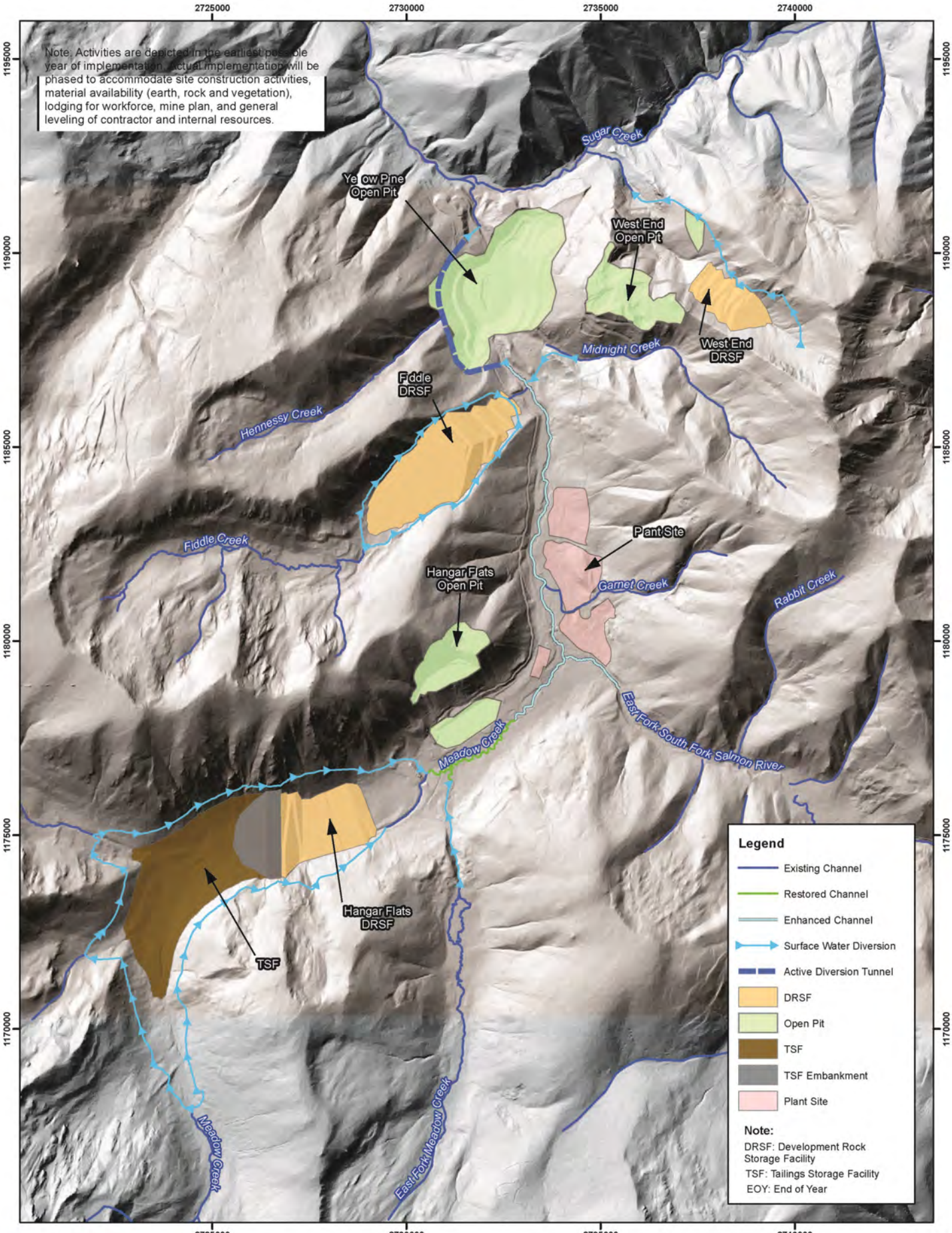
Date: 3/19/2018
Project No: 151586
Client: Midas Gold

0 0.25 0.5 1 Miles

N

Figure A7 - EOY 4
Site-Wide Water Balance
Stibnite Gold Project

Path: Bcbo\P:_Midas Gold\GIS\RFAIs\RFAI-57 - Stream Management\MXDs\SiteWideWaterBalance_20180309\EOY_Streams_4_20180313.mxd



Brown AND Caldwell

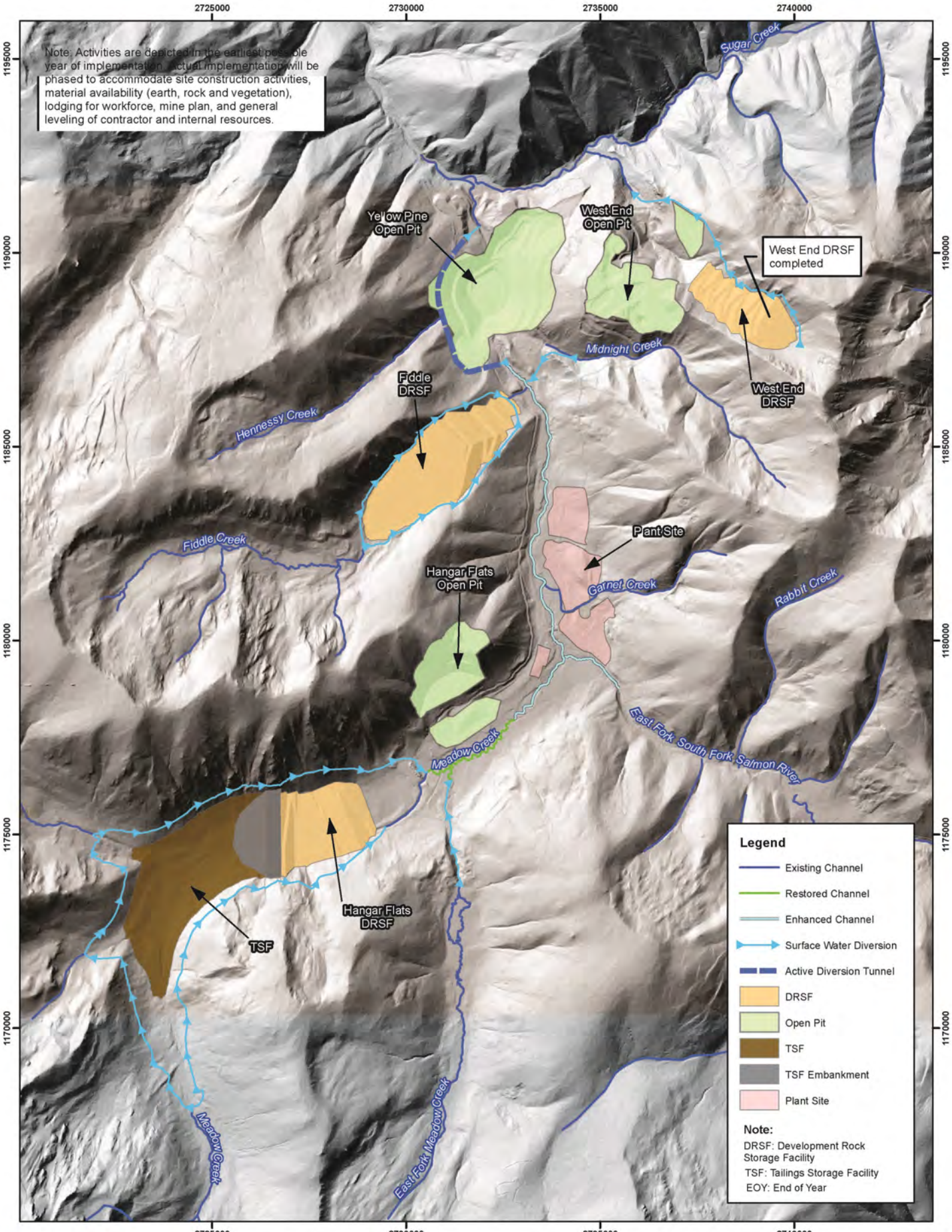
Date: 3/19/2018
Project No: 151586
Client: Midas Gold

0 0.25 0.5 1 Miles

N

Figure A8 - EOY 5
Site-Wide Water Balance
Stibnite Gold Project

Path: Bcbo\P:_Midas Gold\GIS\RFAIs\RFAI-57 - Stream Management\MXDs\SiteWideWaterBalance_20180309\EOY_Streams_5_20180313.mxd



Brown AND Caldwell

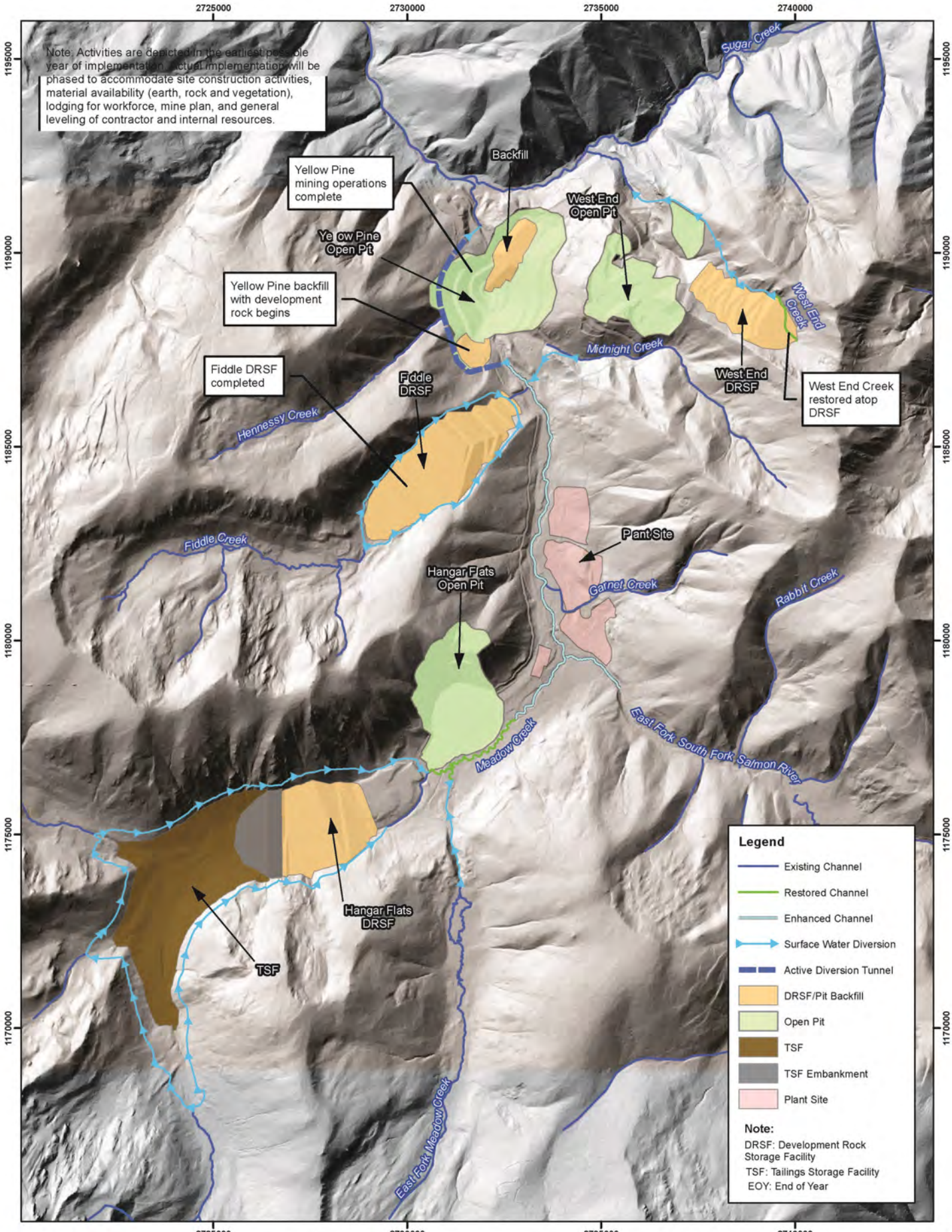
Date: 3/23/2018
Project No: 151586
Client: Midas Gold

0 0.25 0.5 1 Miles

N

Figure A9 - EOY 6
Site-Wide Water Balance
Stibnite Gold Project

Path: Bcboi\\\bcboifp01\Projects_Midas Gold\GIS\RFAIs\RFAI-57 - Stream Management\MXDs\SiteWideWaterBalance_20180309\EOY_Streams_6_20180313.mxd



Brown AND Caldwell

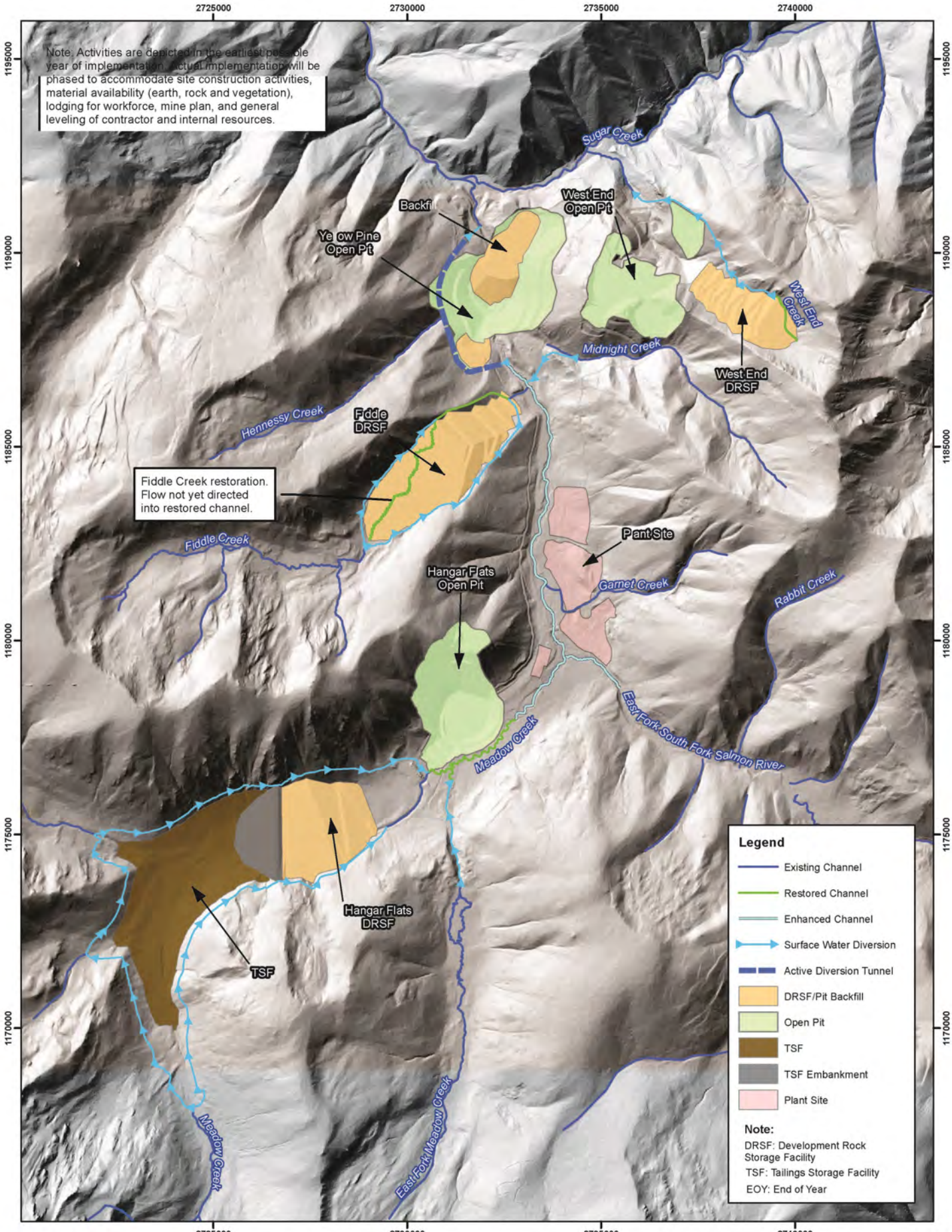
Date: 3/23/2018
Project No: 151586
Client: Midas Gold

0 0.25 0.5 1 Miles

N

Figure A10 - EOY 7
Site-Wide Water Balance
Stibnite Gold Project

Path: Bcboi\\\bcboifp01\Projects_Midas Gold\GIS\RFAIs\RFAI-57 - Stream Management\MXDs\SiteWideWaterBalance_20180309\EOY_Streams_7_20180313.mxd



Brown AND Caldwell

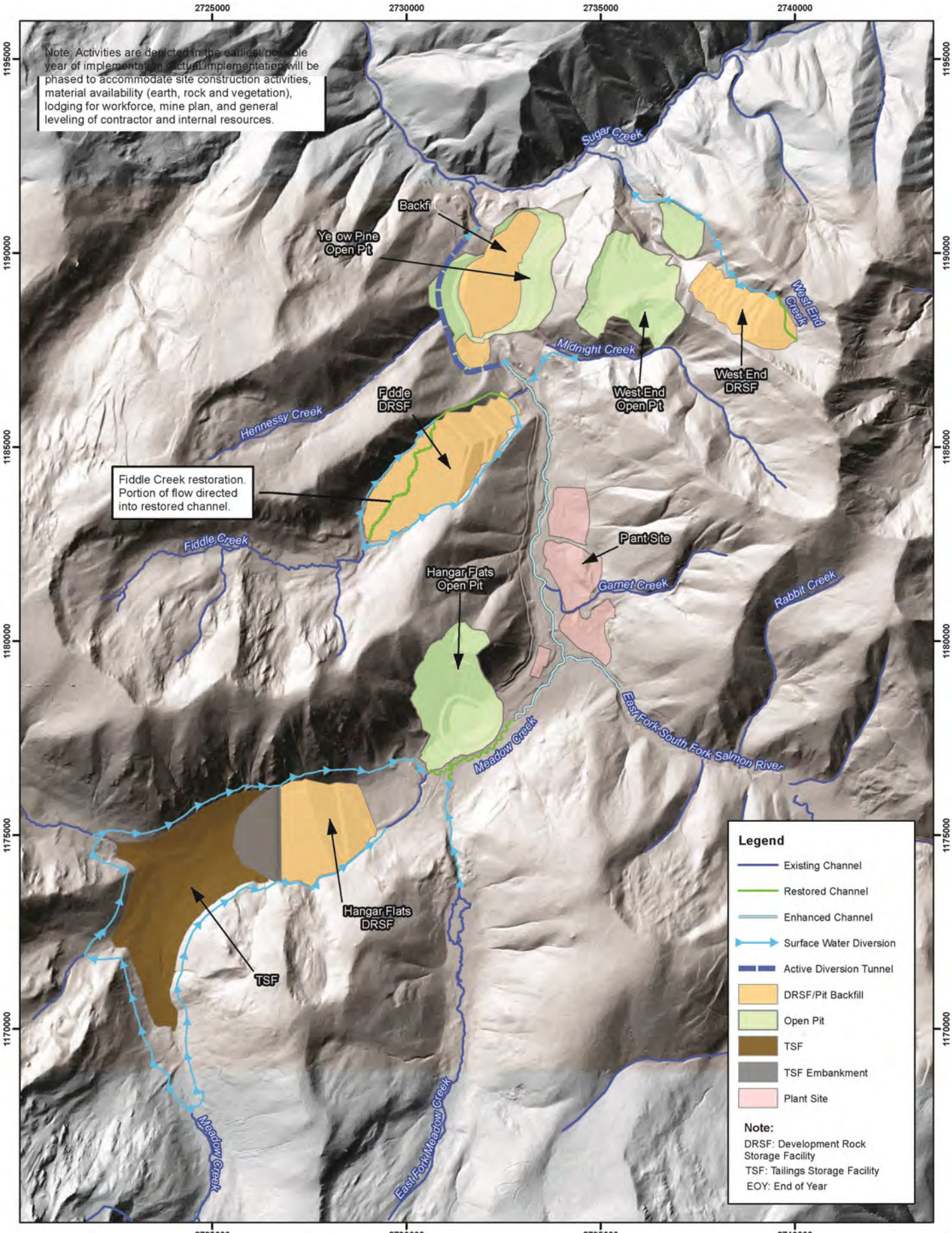
Date: 3/19/2018
Project No: 151586
Client: Midas Gold

0 0.25 0.5 1 Miles

N

Figure A11 - EOY 8
Site-Wide Water Balance
Stibnite Gold Project

Path: Bcbol\P:_Midas Gold\GIS\RFAIs\RFAI-57 - Stream Management\MXDs\SiteWideWaterBalance_20180309\EOY_Streams_8_20180313.mxd



Brown AND Caldwell

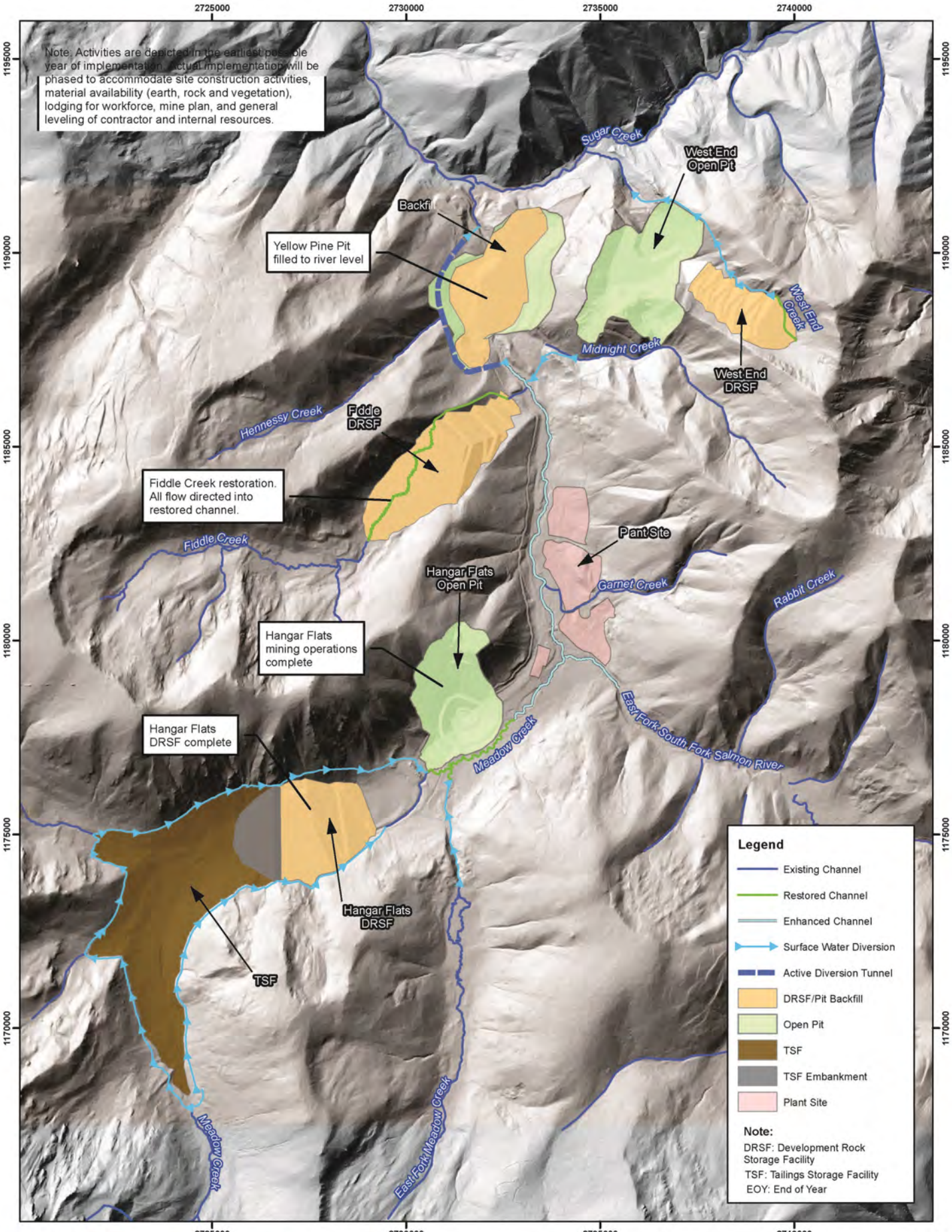
Date: 3/19/2018
Project No: 151586
Client: Midas Gold

0 0.25 0.5 1 Miles

N

Figure A12 - EOY 9
Site-Wide Water Balance
Stibnite Gold Project

Path: Bcbo\P:_Midas Gold\GIS\RFAIs\RFAI-57 - Stream Management\MXDs\SiteWideWaterBalance_20180309\EOY_Streams_9_20180313.mxd



Brown AND Caldwell

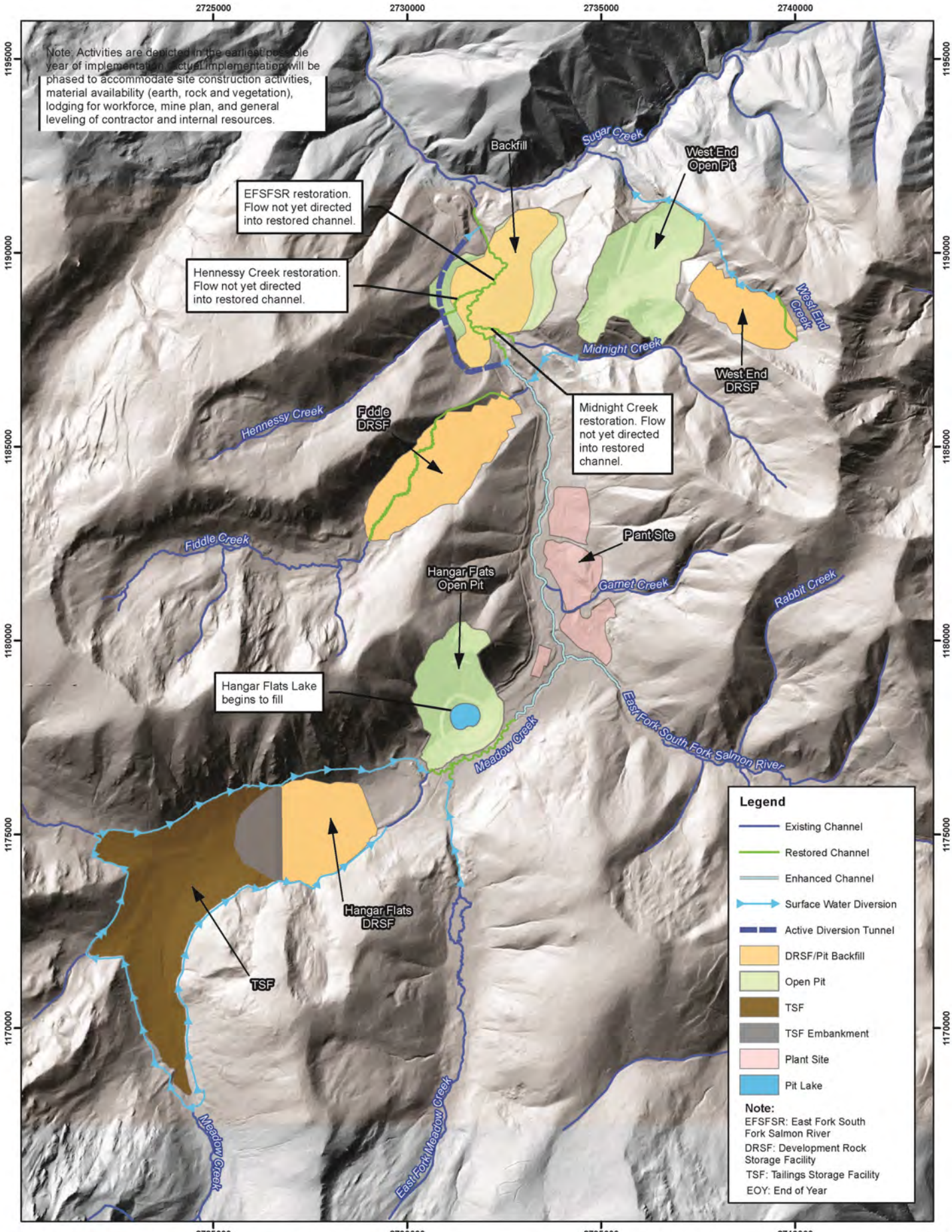
Date: 3/19/2018
Project No: 151586
Client: Midas Gold

0 0.25 0.5 1 Miles

N

Figure A13 - EOY 10
Site-Wide Water Balance
Stibnite Gold Project

Path: Bcbo\P:_Midas Gold\GIS\RFAIs\RFAI-57 - Stream Management\MXDs\SiteWideWaterBalance_20180309\EOY_Streams_10_20180313.mxd



Brown AND Caldwell

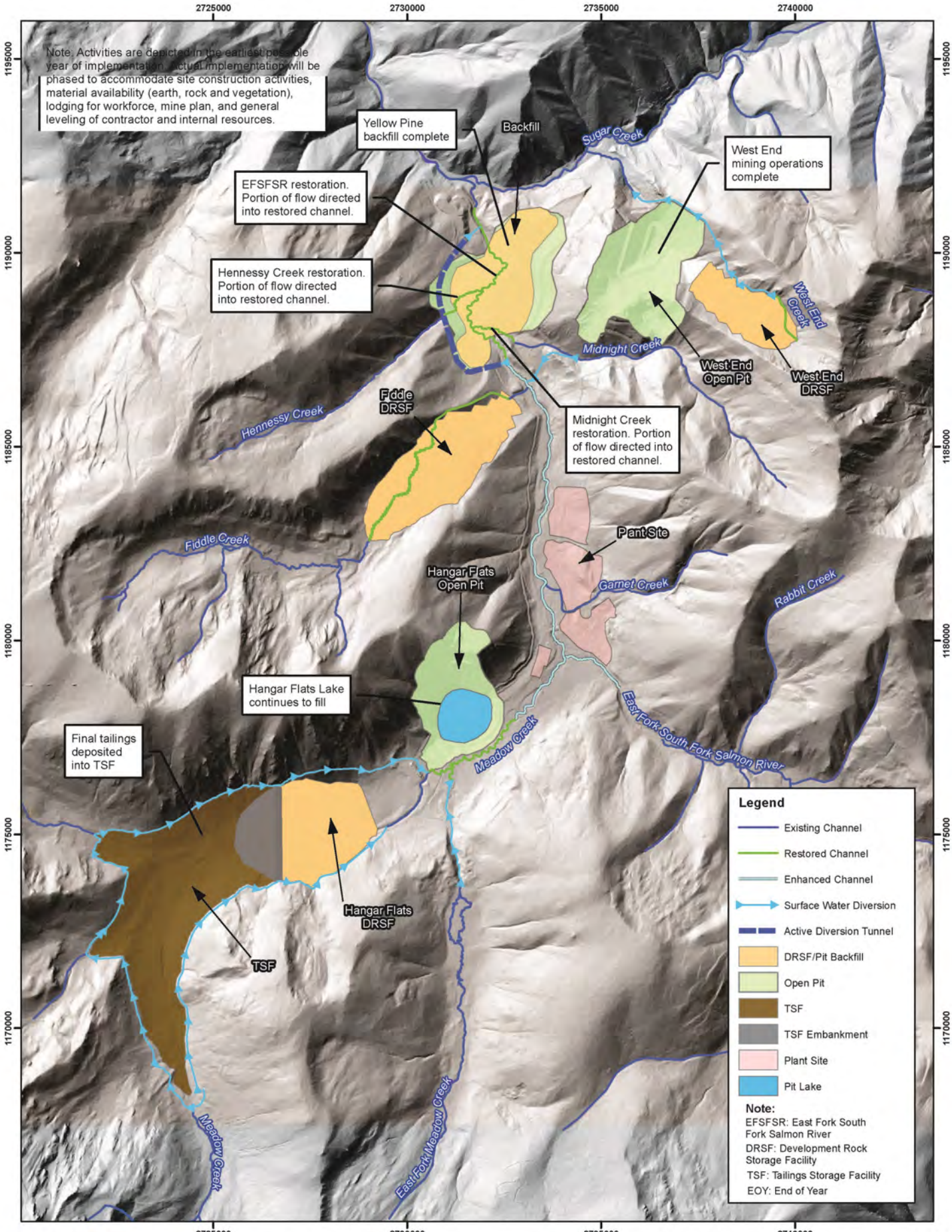
Date: 3/19/2018
Project No: 151586
Client: Midas Gold

0 0.25 0.5 1 Miles

N

Figure A14 - EOY 11
Site-Wide Water Balance
Stibnite Gold Project

Path: Bcbo\P:_Midas Gold\GIS\RFAIs\RFAI-57 - Stream Management\MXDs\SiteWideWaterBalance_20180309\EOY_Streams_11_20180313.mxd



Brown AND Caldwell

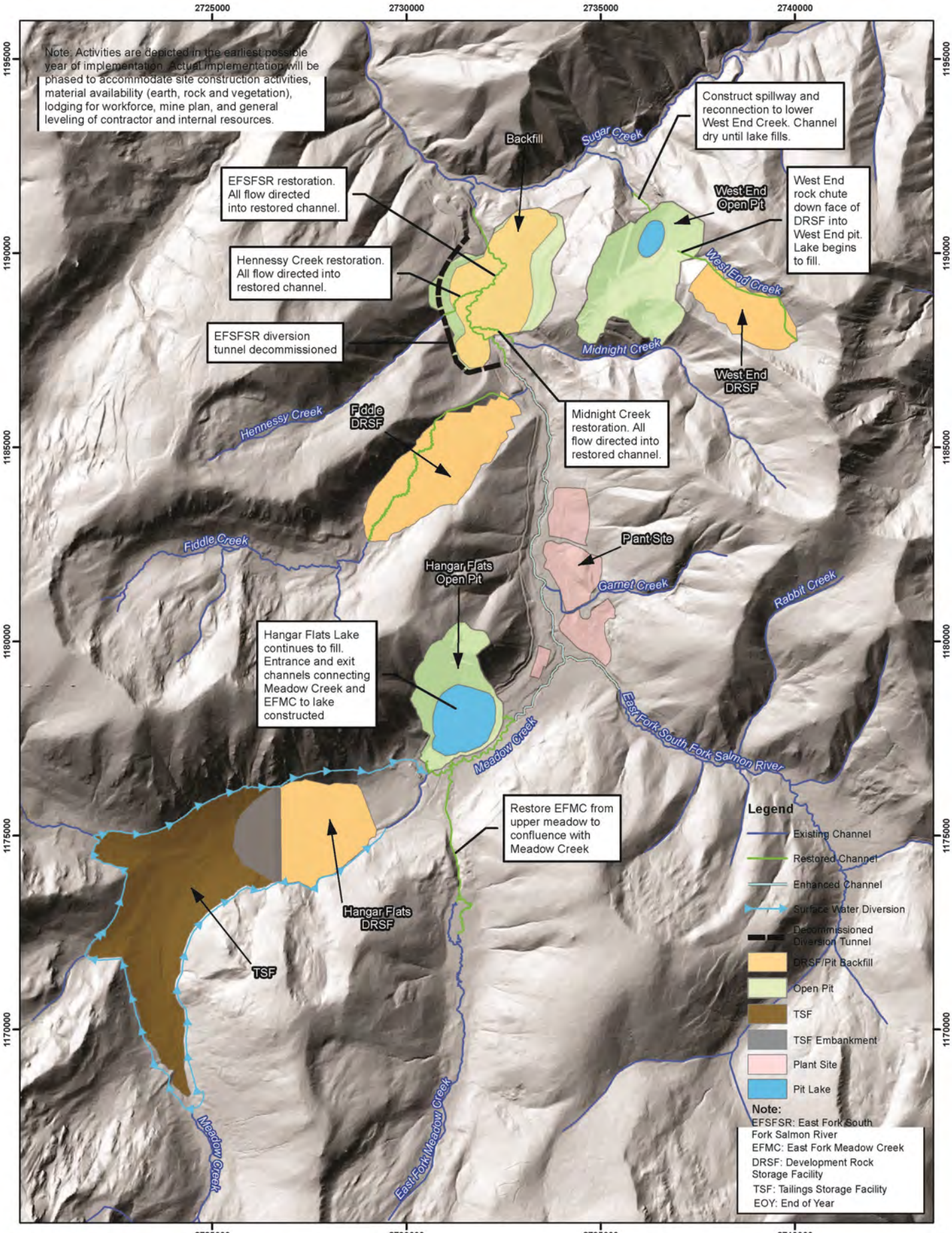
Date: 3/19/2018
Project No: 151586
Client: Midas Gold

0 0.25 0.5 1 Miles

N

Figure A15 - EOY 12
Site-Wide Water Balance
Stibnite Gold Project

Path: Bcbol\P:_Midas Gold\GIS\RFAIs\RFAI-57 - Stream Management\MXDs\SiteWideWaterBalance_20180309\EOY_Streams_12_20180313.mxd



Brown AND Caldwell

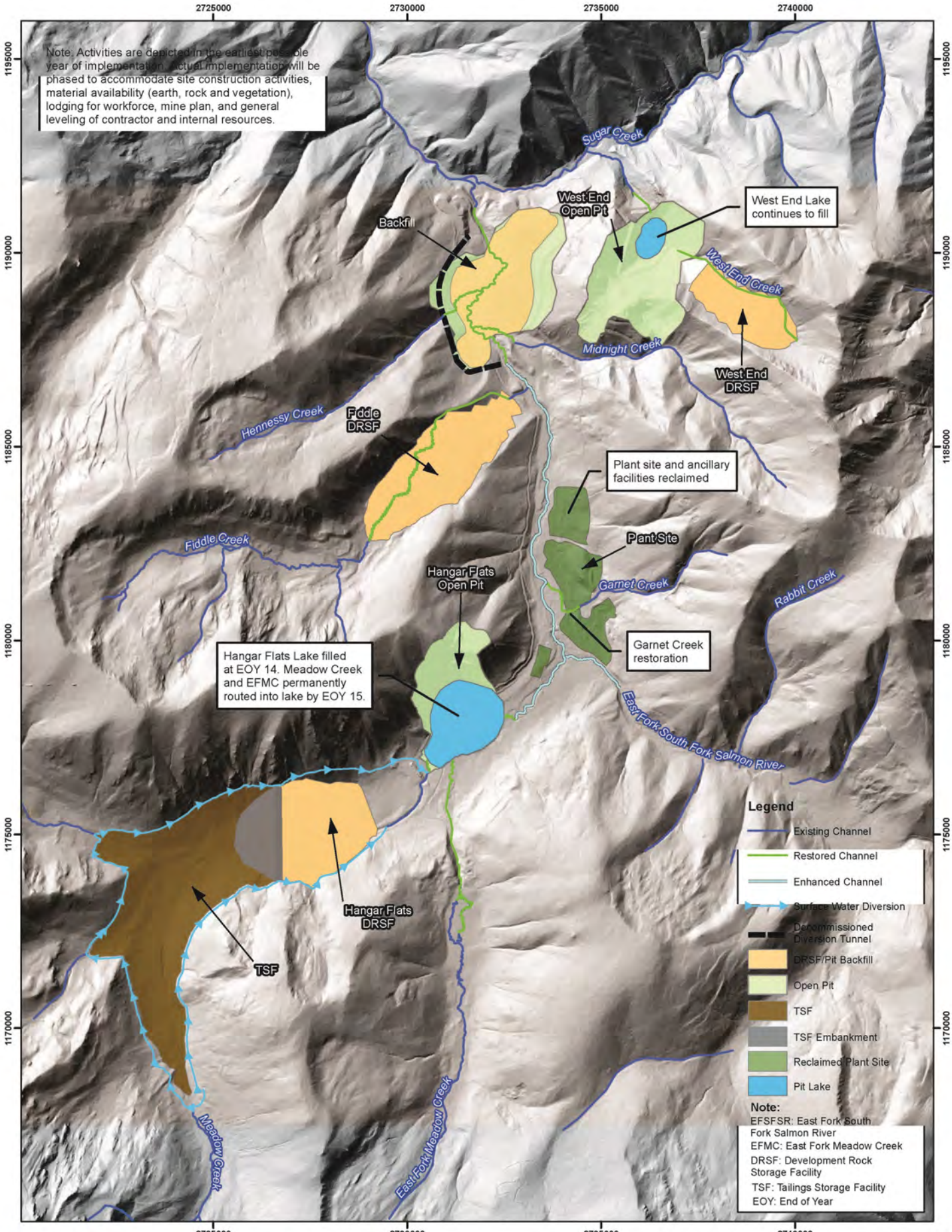
Date: 3/19/2018
Project No: 151586
Client: Midas Gold

0 0.25 0.5 1 Miles

N

Figure A16 - EOY 13 (Post-Mining)
Site-Wide Water Balance
Stibnite Gold Project

Path: Bcbo\P:_Midas Gold\GIS\RFAIs\RFAI-57 - Stream Management\MXDs\SiteWideWaterBalance_20180309\EOY_Streams_13_20180313.mxd



Brown AND Caldwell

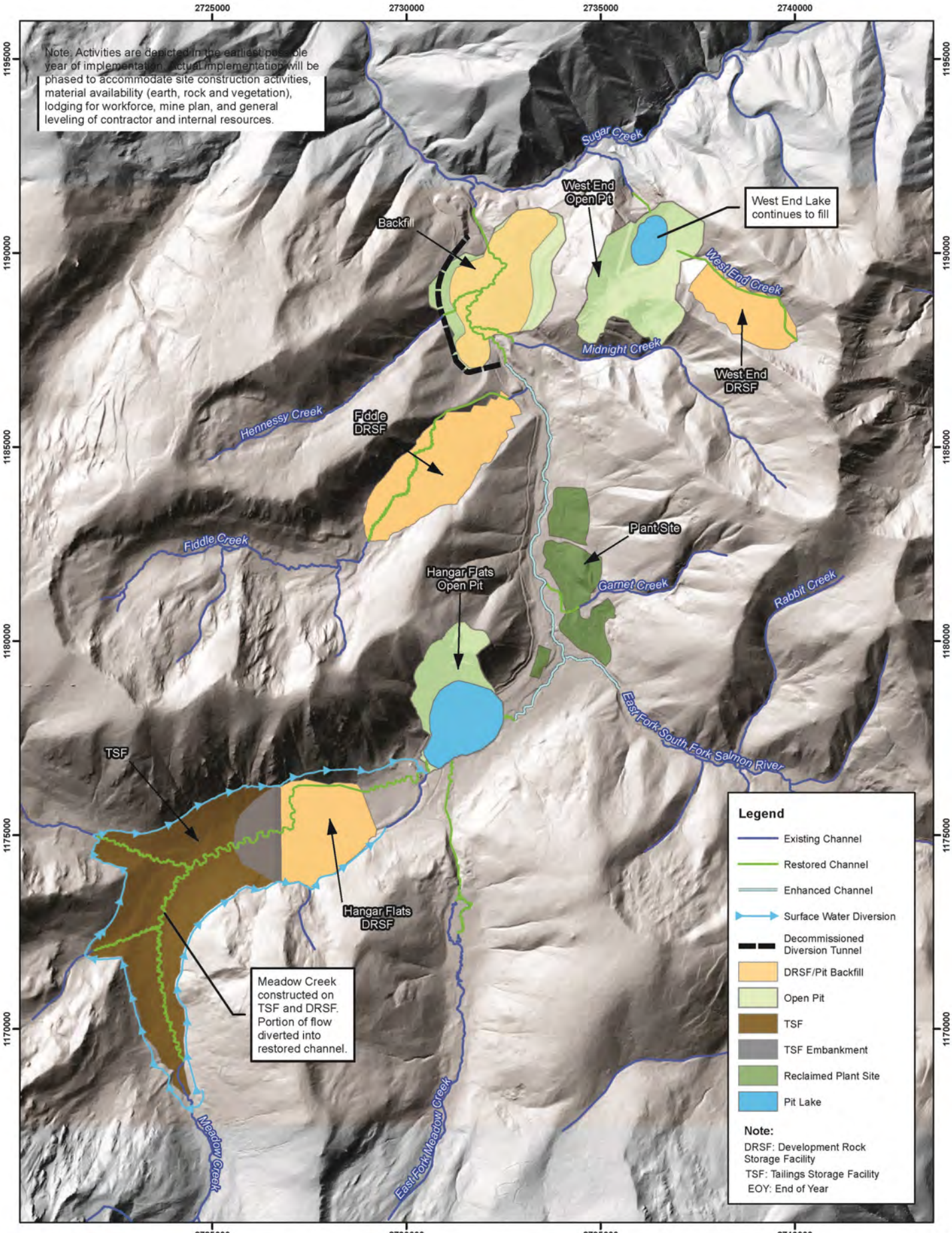
Date: 3/19/2018
Project No: 151586
Client: Midas Gold

0 0.25 0.5 1 Miles

N

Figure A17 - EOY 15 (Post-Mining)
Site-Wide Water Balance
Stibnite Gold Project

Path: Bcbo\P:_Midas Gold\GIS\RFAIs\RFAI-57 - Stream Management\MXDs\SiteWideWaterBalance_20180309\EOY_Streams_15_20180313.mxd



Brown AND Caldwell

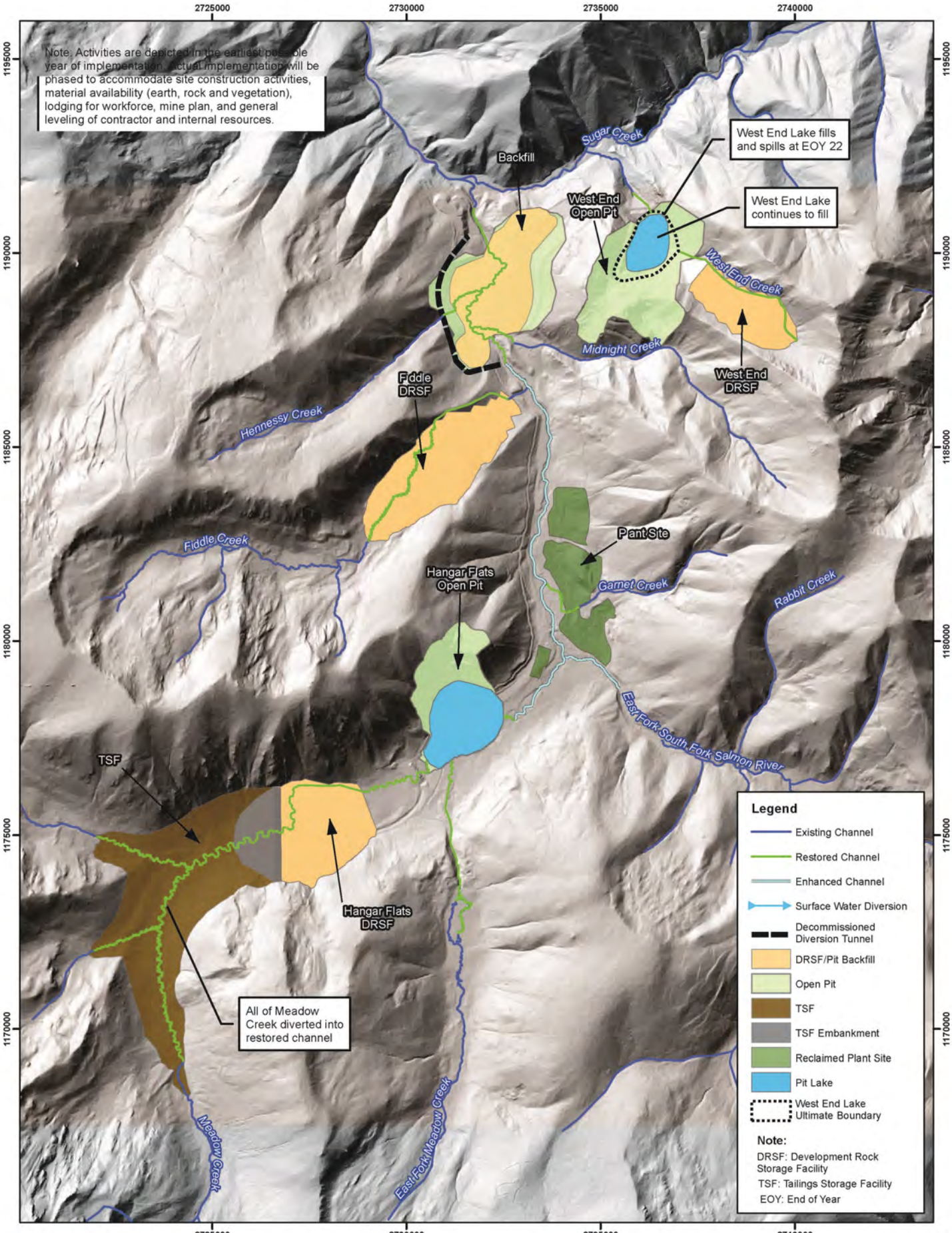
Date: 3/19/2018
Project No: 151586
Client: Midas Gold

0 0.25 0.5 1 Miles

N

Figure A18 - EOY 17 (Post-Mining)
Site-Wide Water Balance
Stibnite Gold Project

Path: Bcbo\P:_Midas Gold\GIS\RFAIs\RFAI-57 - Stream Management\MXDs\SiteWideWaterBalance_20180309\EOY_Streams_17_20180313.mxd



Brown AND Caldwell

Date: 3/19/2018
Project No: 151586
Client: Midas Gold

0 0.25 0.5 1 Miles

N

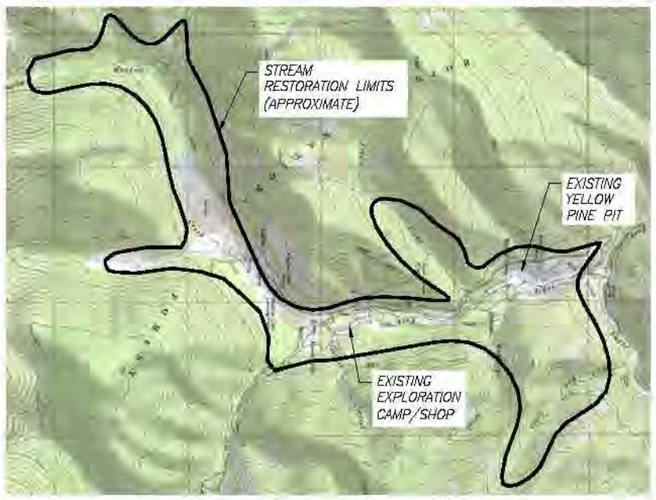
Figure A19 - EOY 18 (Post-Mining) Site-Wide Water Balance
Stibnite Gold Project

Path: Bcbo\P:_Midas Gold\GIS\RFAIs\RFAI-57 - Stream Management\MXDs\SiteWideWaterBalance_20180309\EOY_Streams_18_20180313.mxd

Appendix D: Restoration Design Sheets

STIBNITE GOLD PROJECT
STREAM AND WETLAND RESTORATION CONCEPT DESIGN
DRAWINGS
VALLEY COUNTY, IDAHO

VICINITY MAP
1" = 14 MILES



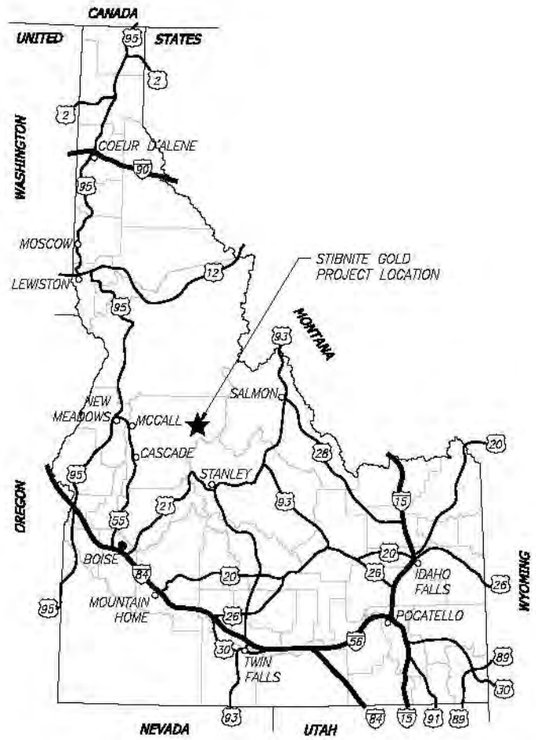
PROJECT MAP
1" = 3,000'

PREPARED FOR:
MIDAS GOLD IDAHO, INC.
405 S. 8TH ST.
SUITE 201
BOISE, ID 83702

MIDAS GOLD

PREPARED BY:
RIO APPLIED SCIENCE & ENGINEERING
2449 S. VISTA AVE.
SUITE B
BOISE, ID 83705

TETRA TECH
3380 AMERICANA TERRACE
SUITE 201
BOISE, ID 83706



LOCATION MAP

SHEET INDEX		
SHEET COUNT	DRAWING NUMBER	SHEET TITLE
1	G-1	COVER SHEET
2	G-2	GENERAL NOTES
3	G-3	GENERAL WETLAND NOTES
4	G-4	PROPOSED STREAM REACHES
5	G-5	PROPOSED FLOODPLAIN WETLAND AREAS
6	G-6	GENERAL LEGEND AND ABBREVIATIONS
7	MC1A-1	MC1A OVERVIEW SHEET - 1
8	MC1A-2	MC1A OVERVIEW SHEET - 2
9	MC1A-3	MC1A TYPICAL PLAN AND PROFILE
10	MC1A-4	MC1A QUANTITIES
11	MC1A-5	MC1A WETLAND SHEET - 1
12	MC1A-6	MC1A WETLAND SHEET - 2
13	MC1A-7	MC1A WETLAND PLANTING SHEET - 1
14	MC1A-8	MC1A WETLAND PLANTING SHEET - 2
15	MC1B-1	MC1B OVERVIEW SHEET
16	MC1B-2	MC1B TYPICAL PLAN AND PROFILE
17	MC1B-3	MC1B QUANTITIES
18	MC1B-4	MC1B WETLAND SHEET
19	MC1B-5	MC1B WETLAND PLANTING SHEET
20	MC1C-1	MC1C OVERVIEW SHEET
21	MC1C-2	MC1C TYPICAL PLAN AND PROFILE
22	MC1C-3	MC1C QUANTITIES
23	MC1C-4	MC1C WETLAND SHEET
24	MC1C-5	MC1C WETLAND PLANTING SHEET
25	MC1D-1	MC1D OVERVIEW SHEET
26	MC1D-2	MC1D TYPICAL PLAN AND PROFILE
27	MC1D-3	MC1D QUANTITIES
28	MC1D-4	MC1D WETLAND SHEET
29	MC1D-5	MC1D WETLAND PLANTING SHEET
30	MC1E-1	MC1E OVERVIEW SHEET - 1
31	MC1E-2	MC1E OVERVIEW SHEET - 2
32	MC1E-3	MC1E TYPICAL PLAN AND PROFILE
33	MC1E-4	MC1E QUANTITIES
34	MC1E-5	MC1E WETLAND SHEET
35	MC1E-6	MC1E WETLAND PLANTING SHEET
36	MC2-1	MC2 OVERVIEW SHEET
37	MC2-2	MC2 TYPICAL PLAN AND PROFILE
38	MC2-3	MC2 QUANTITIES
39	MC2-4	MC2 WETLAND SHEET
40	MC2-5	MC2 WETLAND PLANTING SHEET
41	MC3-1	MC3 OVERVIEW SHEET
42	MC3-2	MC3 QUANTITIES
43	MC4-1	MC4 OVERVIEW SHEET
44	MC4-2	MC4 TYPICAL PLAN AND PROFILE
45	MC4-3	MC4 QUANTITIES
46	MC4-4	MC4 WETLAND PLANTING SHEET
47	MC4-5	MC4 WETLAND PLANTING SHEET
48	MC5-1	MC5 OVERVIEW SHEET
49	MC5-2	MC5 TYPICAL PLAN AND PROFILE
50	MC5-3	MC5 QUANTITIES
51	MC5-4	MC5 WETLAND PLANTING SHEET
52	MC6-1	MC6 OVERVIEW SHEET
53	MC6-2	MC6 QUANTITIES
54	BC1-1	BC1 OVERVIEW SHEET
55	BC1-2	BC1 QUANTITIES
56	BC1-3	BC1 WETLAND SHEET
57	BC2-1	BC2 OVERVIEW SHEET
58	BC2-2	BC2 TYPICAL PLAN AND PROFILE
59	BC2-3	BC2 QUANTITIES
60	BC3-1	BC3 OVERVIEW SHEET
61	BC3-2	BC3 TYPICAL PLAN AND PROFILE
62	BC3-3	BC3 QUANTITIES
63	EF1-1	EF1 OVERVIEW SHEET
64	EF1-2	EF1 QUANTITIES
65	EF2-1	EF2 OVERVIEW SHEET - 1
66	EF2-2	EF2 OVERVIEW SHEET - 2
67	EF2-3	EF2 OVERVIEW SHEET - 3
68	EF2-4	EF2 QUANTITIES
69	EF3-1	EF3 OVERVIEW SHEET
70	EF3-2	EF3 TYPICAL PLAN AND PROFILE
71	EF3-3	EF3 QUANTITIES
72	EF3-4	EF3 WETLAND SHEET
73	EF3-5	EF3 WETLAND PLANTING SHEET
74	EF4-1	EF4 OVERVIEW SHEET
75	EF4-2	EF4 QUANTITIES
76	FC1-1	FC1 OVERVIEW SHEET - 1
77	FC1-2	FC1 OVERVIEW SHEET - 2
78	FC1-3	FC1 TYPICAL PLAN AND PROFILE
79	FC1-4	FC1 QUANTITIES
80	FC1-5	FC1 WETLAND SHEET - 1
81	FC1-6	FC1 WETLAND SHEET - 2
82	FC1-7	FC1 WETLAND PLANTING SHEET - 1
83	FC1-8	FC1 WETLAND PLANTING SHEET - 2
84	FC2-1	FC2 OVERVIEW SHEET
85	FC2-2	FC2 QUANTITIES
86	MNC1-1	MNC1 OVERVIEW SHEET
87	MNC1-2	MNC1 TYPICAL PLAN AND PROFILE
88	MNC1-3	MNC1 QUANTITIES
89	MNC2-1	MNC2 OVERVIEW SHEET
90	MNC2-2	MNC2 TYPICAL PLAN AND PROFILE
91	MNC2-3	MNC2 QUANTITIES
92	HC1&2-1	HC1&2 OVERVIEW SHEET
93	HC1&2-2	HC1&2 TYPICAL PLAN AND PROFILE
94	HC1&2-3	HC1&2 QUANTITIES
95	GC1-1	GC1 OVERVIEW SHEET
96	GC1-2	GC1 TYPICAL PLAN AND PROFILE
97	GC1-3	GC1 QUANTITIES
98	WE1-1	WE1 OVERVIEW SHEET
99	WE1-2	WE1 QUANTITIES
100	WE1-3	WE1 WETLAND SHEET
101	WE1-4	WE1 WETLAND PLANTING SHEET
102	WE2-1	WE2 OVERVIEW SHEET - 1
103	WE2-2	WE2 OVERVIEW SHEET - 2
104	WE2-3	WE2 QUANTITIES
105	WE3-1	WE3 OVERVIEW SHEET
106	WE3-2	WE3 QUANTITIES
107	MC4D-1	MC4D OVERVIEW SHEET
108	MC4D-2	MC4D TYPICAL PLAN AND PROFILE
109	MC4D-3	MC4D QUANTITIES
110	MC5D-1	MC5D OVERVIEW SHEET
111	MC5D-2	MC5D TYPICAL PLAN AND PROFILE
112	MC5D-3	MC5D QUANTITIES
113	BC3D-1	BC3D OVERVIEW SHEET
114	BC3D-2	BC3D TYPICAL PLAN AND PROFILE
115	BC3D-3	BC3D QUANTITIES
116	D-1	TYPICAL DETAILS - 1
117	D-2	TYPICAL DETAILS - 2
118	D-3	TYPICAL DETAILS - 3
119	D-4	TYPICAL DETAILS - 4
120	D-5	TYPICAL DETAILS - 5
121	D-6	TYPICAL DETAILS - 6
122	D-7	TYPICAL DETAILS - 7
123	D-8	TYPICAL DETAILS - 8
124	D-9	TYPICAL DETAILS - 9
125	D-10	TYPICAL DETAILS - 10
126	D-11	TYPICAL DETAILS - 11
127	D-12	TYPICAL DETAILS - 12
128	D-13	TYPICAL DETAILS - 13
129	D-14	TYPICAL DETAILS - 14
130	D-15	TYPICAL DETAILS - 15
131	D-16	TYPICAL DETAILS - 16
132	D-17	TYPICAL DETAILS - 17
133	D-18	TYPICAL DETAILS - 18
134	D-19	TYPICAL DETAILS - 19
135	D-20	TYPICAL DETAILS - 20
136	D-21	WETLAND DETAIL SHEET - 1
137	D-22	WETLAND DETAIL SHEET - 2
138	D-23	WETLAND DETAIL SHEET - 3
139	D-24	WETLAND DETAIL SHEET - 4

Applied Science & Engineering
2449 S. Vista Ave. Suite B
Boise, Idaho 83705

TETRA TECH

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Cover Sheet
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: ---

Drawing Name
Cover Sheet

Drawing No.
G-1

STIBNITE GOLD PROJECT STREAM RESTORATION GOALS, OBJECTIVES AND APPROACH:

1. PROJECT GOAL IS TO RESTORE STREAMS AND ASSOCIATED RIPARIAN CORRIDORS WITHIN THE STIBNITE MINE TO BETTER THAN EXISTING CONDITIONS POST MINING OPERATIONS.
2. STREAM DESIGN OBJECTIVES INCLUDE:
   - REMOVAL OF YELLOW PINE PIT BARRIER TO RESTORE FISH PASSAGE AND MAKE APPROXIMATELY 29,500 LINEAL FEET OF THE EAST FORK SOUTH FORK SALMON RIVER (EFSFSR) AND MEADOW CREEK ACCESSIBLE TO ANADROMOUS FISH FOR THE FIRST TIME SINCE 1938.
   - RESTORE AND ENHANCE ROUGHLY 14.5 MILES OF PERENNIAL AND NON-PERENNIAL STREAM AND RIPARIAN HABITAT.
3. THE OVERALL STREAM ENHANCEMENT AND RESTORATION APPROACH IS TO RESTORE PERMANENT FISH PASSAGE ABOVE THE EXISTING YELLOW PINE PIT BARRIER BY FILLING THE PIT AND BUILDING A NEW STREAM CHANNEL OVER THE TOP OF THE FILL, RESTORE HIGH-QUALITY STREAM CHANNELS OVER THE TOP OF AREAS THAT WILL BE IMPACTED BY FUTURE MINING OPERATIONS, AND ENHANCE CERTAIN STREAMS THAT WILL BE OTHERWISE UNAFFECTED BY MINING.
   - ENHANCE = IMPROVE PHYSICAL CHANNEL PROCESSES AND HABITAT WITHIN THE EXISTING STREAM CHANNEL.
   - RESTORE = CREATE A NEW STREAM CHANNEL WHERE THE NATURAL CHANNEL HAS BEEN FILLED OR OTHERWISE ALTERED BY MINING-RELATED ACTIVITIES.

CONCEPTUAL DESIGN PHILOSOPHY:

1. THIS CONCEPTUAL DESIGN SHOWS PROPOSED CONDITIONS AT POST MINING OPERATIONS.
2. THE PROJECT AREA HAS BEEN DIVIDED INTO MULTIPLE REACHES FOR EACH STREAM CHANNEL.
3. STREAMS HAVE BEEN DIVIDED INTO REACHES BY VARIATION IN CHANNEL SLOPE, CHANGES IN DRAINAGE AREA (TRIBUTARY CONNECTION), AND CHANGES FROM RESTORATION TO ENHANCEMENT.
4. EACH STREAM REACH DESIGN INCLUDES ONE OR MORE PLAN VIEW SHEETS DEPICTING THE CHANNEL PATTERN AND ASSOCIATED FLOODPLAIN WIDTH. THESE PLAN VIEW SHEETS SHOW THE PROPOSED OR EXISTING CHANNEL ALIGNMENT AND PROVIDE METRICS INCLUDING PROPOSED VALLEY LENGTH, PROPOSED CHANNEL LENGTH, PROPOSED CHANNEL SINUOUSITY, PROPOSED VALLEY SLOPE AND PROPOSED CHANNEL SLOPE ON A PER REACH BASIS.
5. FOLLOWING EACH REACH'S PLAN VIEW DESIGN SHEETS IS A TYPICAL DIMENSIONS SHEET THAT REPRESENTS APPROXIMATELY ONE FULL MEANDER WAVE LENGTH. THESE SHEETS PROVIDE A TYPICAL RANGE IN DIMENSIONS FOR CHANNEL SHAPE IN SECTION, PLANFORM AND VERTICAL PROFILE. CONCEPTUAL SECTIONS INCLUDE A TYPICAL SECTION AT A RIFFLE AND A TYPICAL SECTION AT A POOL. THE TYPICAL PROFILE SHOWS TYPICAL RIFFLE-POOL SEQUENCING OR STEP POOL SEQUENCING DEPENDING ON CHANNEL SLOPE.
6. IT IS INTENDED THAT THE ASSOCIATED RANGES IN CHANNEL DIMENSIONS BE UTILIZED AND THESE SECTIONS AND PROFILES WILL BE REPEATED FOR THE PROPOSED CHANNEL ALIGNMENT SHOWN IN THE PLAN SHEETS WITH SMOOTH TRANSITIONS BETWEEN RIFFLE AND POOL SECTIONS. TYPICAL SECTIONS FOR RUNS AND GLIDES WILL BE ADDED TO THE DRAWINGS FOR ADDITIONAL DETAIL IN A FUTURE DESIGN PHASE.
7. THE CHANNEL SHAPE WILL VARY WITHIN THE ALLOWABLE RANGE TO ALLOW FOR NATURAL VARIATION WITHIN THE CHANNEL AND FLOODPLAIN INCREASING THE HYDRAULIC DIVERSITY AND ASSOCIATED AQUATIC HABITAT WITHIN EACH RESTORED CHANNEL.
8. FOLLOWING THE TYPICAL PLAN AND PROFILE SHEET IS A QUANTITIES SHEET FOR EACH REACH. THIS QUANTITIES SHEET INCLUDES ASSOCIATED BANK TREATMENTS, LOG HABITAT STRUCTURES, CONSTRUCTED RIFFLES, PLANTING ZONES AND ASSOCIATED AREAS. THESE QUANTITIES WILL ALLOW FOR FUTURE ACCURATE IMPLEMENTATION, ESTIMATING, AND QUANTIFICATION OF CERTAIN METRICS ASSOCIATED WITH WATERSHED CONDITION INDICATOR (WCI) SCORING.
9. AT THE END OF THE CONCEPTUAL PLAN SET IS A NUMBER OF TYPICAL DETAILS RANGING FROM TYPICAL BANK TREATMENTS, RIFFLE CONSTRUCTION, VARIOUS WOOD HABITAT STRUCTURES, PLANTING PLAN AND SCHEDULE, ETC. EACH OF THESE DETAILS INCLUDES NOTES ON APPLICATION FREQUENCY, AND PROVIDES REPRESENTATIVE PHOTOS FOR CONCEPTUAL REFERENCE.

GENERAL NOTES:

1. THESE DESIGNS AND DRAWINGS HAVE BEEN PREPARED FOR THE EXCLUSIVE USE OF MIDAS GOLD IDAHO, INC. AND THEIR REPRESENTATIVE AUTHORIZED AGENTS. NO OTHER PARTY MAY RELY ON THE PRODUCT OF OUR SERVICES UNLESS RIO APPLIED SCIENCE AND ENGINEERING AND TETRA TECH AGREE IN WRITING IN ADVANCE OF SUCH USE.
2. THESE PLANS ARE INTENDED FOR CONCEPTUAL USE ONLY AND ARE NOT INTENDED FOR CONSTRUCTION.
3. THE ENHANCEMENT DESIGNS DEPICTED HEREIN ARE APPROXIMATE AND ARE INTENDED TO EXPRESS THE OVERALL DESIGN INTENT OF THE PROJECT.
4. DRAWING HORIZONTAL COORDINATES ARE REFERENCED TO IDAHO STATE PLANE WEST, US FEET, USING THE NORTH AMERICAN DATUM OF 1983.
5. VERTICAL ELEVATION IS REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.
6. THESE DESIGN DRAWINGS WERE ORIGINALLY PRODUCED IN COLOR.
7. THESE PLANS DO NOT SHOW LOCATIONS OF INDIVIDUAL WOOD STRUCTURES. HOWEVER, APPROPRIATE REACHES (IDENTIFIED IN THE BASIS OF DESIGN REPORT) WILL INCLUDE WOOD STRUCTURES TO MEET DESIGN OBJECTIVES AND MINIMUM WOOD LOADING RATES.
8. FOR THE SGP STREAM DESIGN NON-PERENNIAL REFER TO A STREAM WITH DISTINCT BED AND BANKS THAT EXHIBITS SURFACE FLOW DURING ONLY A PORTION OF THE YEAR (I.E. NOT PERENNIAL).

CONCEPT DESIGN RESTORED AND ENHANCED CHANNEL LENGTH SUMMARY

MINE FEATURE	STREAM NAME	STREAM REACH(S)	REACH DRAWING(S)	PERENNIAL CHANNEL LENGTH (FT)**	NON-PERENNIAL CHANNEL LENGTH (FT)**	TRANSITIONAL PERENNIAL CHANNEL LENGTH** (FT)	TRANSITIONAL NON-PERENNIAL CHANNEL LENGTH** (FT)
TAILINGS STORAGE FACILITY (TSF)	MEADOW CREEK AND TRIBUTARIES	MC1A, MC1B, MC1C, MC1D, & MC1E	MC1A-1 TO MC1A-2, MC1B-1, MC1C-1, MC1D-1, & MC1E-1 TO MC1E-2	19,291	9,012	2,124	1,262
HANGAR FLATS DEVELOPMENT ROCK STORAGE FACILITY (DRSF)	MEADOW CREEK	MC2 & MC3	MC2-1 & MC3-1	3,801	0	0	0
HANGAR FLATS PIT	MEADOW CREEK	MC4 & MC5	MC4-1 & MC5-1	3,293	180	0	0
	MEADOW CREEK[E]	MC6	MC6-1	2,357	0	0	0
	BLOWOUT CREEK	BC3	BC3-1	822	0	0	0
BLOWOUT CREEK RESTORATION	BLOWOUT CREEK	BC1 & BC2	BC1-1 & BC2-1	4,682	0	0	0
PROCESSING FACILITY	EAST FORK SOUTH FORK SALMON RIVER[E] (EFSFSR)	EF1	EF1-1	1,897	0	0	0
	GARNET CREEK	GC1	GC1-1	285	0	0	0
FIDDLE DRSF	FIDDLE CREEK	FC1 & FC2	FC1-1 TO FC1-2 & FC2-1	8,076	0	176	0
YELLOW PINE PIT / YELLOW PINE DRSF	EFSFSR	EF3	EF3-1	4,606	2,011	0	0
	EFSFSR[E]	EF2 & EF4	EF2-1 TO EF2-3 & EF4-1	11,261	0	0	0
	HENNESSY CREEK	HC1 & HC2	HC1&2-1	1,480	0	246	0
	MIDNIGHT CREEK	MNC1 & MNC2	MNC1-1 & MNC2-1	1,361	0	2,098	427
WEST END PIT / WEST END DRSF	WEST END CREEK*	WE1, WE2, & WE3	WE1-1 TO WE1-2, WE2-1 TO WE2-2, & WE3-1	0	5,057	0	0
			TOTAL STREAM RESTORATION LENGTH	47,697	16,260	4,644	1,689
			TOTAL STREAM ENHANCEMENT LENGTH	15,515	0	0	0
			TOTAL STREAM MITIGATION LENGTH (RESTORATION AND ENHANCEMENT)	63,212	16,260	4,644	1,689

E = ENHANCEMENT OF EXISTING STREAM CHANNEL (REMOVE FISH PASSAGE BARRIERS, ENHANCE HABITAT, IMPROVE RIPARIAN CONDITIONS WITHOUT CHANGES TO CHANNEL'S GENERAL LINE AND GRADE). ALL OTHER STREAMS ARE PLANNED FOR RESTORATION.

* WEST END CREEK IS ASSUMED TO REMAIN NON-PERENNIAL UPSTREAM AND DOWNSTREAM OF THE PIT LAKE, BUT MAY BE NON-PERENNIAL BELOW WEST END DRSF WETLANDS AND/OR WEST END PIT LAKE SPILLWAY AT CLOSURE. STREAM RESTORATION QUANTITY MAY BE REVISED AS PIT LAKE HYDROLOGY IS BETTER UNDERSTOOD.

** PERENNIAL CHANNEL LENGTH REPORTED ON THIS SHEET AND THE OVERVIEW SHEETS INCLUDES THE LENGTH OF THE MAIN STEM AND PERENNIAL SIDE CHANNELS INCLUDED IN THE PROPOSED DESIGN. THE PROPOSED CHANNEL LENGTH REPORTED ON THE OVERVIEW SHEETS INCLUDES THE LENGTH OF ONLY THE MAIN STEM PERENNIAL CHANNEL TO SUPPORT SINUOSITY AND GRADIENT CALCULATIONS.

*** EXISTING STREAM LENGTH DOES NOT INCLUDE STREAM LENGTH THROUGH THE EXISTING YELLOW PINE PIT LAKE.

**** PROPOSED STREAM LENGTH DOES NOT INCLUDE STREAM LENGTH THROUGH THE PROPOSED HANGAR FLATS PIT LAKE OR WEST END PIT LAKE.

STIBNITE GOLD PROJECT IMPACTS VERSUS PROPOSED TREATMENTS CHANNEL LENGTH SUMMARY

DRAINAGE	STIBNITE GOLD PROJECT STREAM IMPACTS				PROPOSED STREAM TREATMENTS			
	PERENNIAL CHANNEL LENGTH** (FT)	NON-PERENNIAL CHANNEL LENGTH** (FT)	TRANSITIONAL PERENNIAL CHANNEL LENGTH** (FT)	TRANSITIONAL NON-PERENNIAL CHANNEL LENGTH** (FT)	PERENNIAL CHANNEL LENGTH** (FT)	NON-PERENNIAL CHANNEL LENGTH** (FT)	TRANSITIONAL PERENNIAL CHANNEL LENGTH** (FT)	TRANSITIONAL NON-PERENNIAL CHANNEL LENGTH** (FT)
BLOWOUT CREEK (EAST FORK MEADOW CREEK)****	6,509	0	0	0	5,504	0	0	0
EAST FORK SOUTH FORK SALMON RIVER***	16,255	6,113	0	0	17,764	2,011	0	0
FIDDLE CREEK	6,630	589	175	0	8,076	0	176	0
GARNET CREEK	239	0	0	0	285	0	0	0
HENNESSY CREEK	4,012	475	246	0	1,480	0	246	0
MEADOW CREEK****	30,193	10,739	2,124	1,195	28,741	9,192	2,124	1,262
MIDNIGHT CREEK	598	0	2,124	427	1,361	0	2,098	427
WEST END CREEK	0	6,884	0	0	0	5,057	0	0
TOTAL	64,436	24,800	4,669	1,622	63,212	16,260	4,644	1,689

NOTE:

1. A COMPREHENSIVE SUMMARY OF MINING RELATED IMPACTS TO STREAM CHANNELS IS INCLUDED IN APPENDIX F — DRAFT CONCEPTUAL WETLAND AND STREAM MITIGATION PLAN OF THE PLAN OF RESTORATION AND OPERATIONS DATED SEPTEMBER 2016 (MIDAS GOLD, 2016).

Applied Science & Engineering
2495 S. Vista Ave. Suite B
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Stibnite Gold Project
Stream and Wetland Restoration Concept Design
General Notes, Design Philosophy, Impacts Summary
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: ---

Drawing Name
General Notes

Drawing No.
G-2

Wetland Restoration Goals and Objectives

1. Project Goal is to design high quality replacement wetlands to be constructed over mine facilities and on adjacent lands to repair legacy impacts and replace the functions and values of wetlands removed during mine, mill, road and powerline construction.

2. Design goal is to design a complex mosaic of general wetland types which are generally classified as Riparian Fringe And Floodplain Wetlands, Valley Margin Wetlands, and Groundwater Discharge Wetlands. Restoration of wetlands presently located in Upper Blowout Creek and previously impacted by dam failure and headcutting is also a design goal.

3. Within each general wetland type described above, design a complex mosaic of wetland vegetation consisting of four general planting zones including the following:

1. *Palustrine Emergent (PEM)*
2. *Palustrine Shrub-Scrub (PSS)*
3. *Palustrine Forested (PFO)*
4. *Palustrine Aquatic Bed (PAB)*

Conceptual Design Philosophy

1. Design wetlands within lined reaches whose overall dimensions (floodplain width), configuration and location have been selected for restored stream reaches.

2. Design floodplain surface so as to be low enough so that the groundwater surface is within 12 inches of the finished floodplain elevation for all but 14 days out of the growing season in at least 5 out of 10 years. This philosophy exceeds Corps of Engineers' criteria for wetlands as defined in ERDC/EL 10-3. This results in an 'inset' floodplain surface that is in some instances lower the bankfull elevation of the stream within the floodplain.

3. Design wetlands generally within the stream reaches which are lined with an impermeable liner. This allows predictability of the elevation of the water table within the lined reach and provides certainty that the criteria noted above in 2 will be met.

4. The designs included herein are conceptual in nature and are not intended for use during construction.

5. The design sheets presented herein generally consist of a wetlands overview sheet showing the locations, types and extents of a wetlands associated with a particular stream reach followed by a wetlands planting sheet that shows the desired planting zones and vegetation within each wetland.

SUMMARY TABLE OF WETLAND DESIGN ACREAGES

Drainage	Mine Feature	Stream Reach ID	Proposed Year of Construction	Location	Valley Margin Wetlands			Riparian Fringe and Floodplain Wetlands				Groundwater Discharge Wetlands		Blowout Creek Restored Wetlands			Total	Associated Functional Units
					PEM	PSS	PFO	PAB	PEM	PSS	PFO	PEM	PSS	PAB	PEM	PSS		
Meadow Creek	Tailings Storage Facility (TSF)	MC1a	17	Southernmost branch of creek on TSF	0.78	0.87	1.27	1.11	25.99	4.07	2.99	–	–	–	–	–	38.9	285.88
		MC1b	17	Middle branch of creek on TSF	0.12	0.10	0.1	0.18	5.27	1.58	1.28	–	–	–	–	–	8.58	68.45
		MC1c	17	Northern branch of creek on TSF	0.83	0.75	0.37	0.3	8.6	1.58	0.97	–	–	–	–	–	13.4	102.15
		MC1d	17	Trunk stream between middle branch and northern branch on TSF	–	–	–	0.31	5.35	0.49	–	–	–	–	–	–	7.14	54.99
		MC1e	17	Trunk stream below confluence of northern branch on TSF	–	–	–	0.49	11.91	0.97	–	–	–	–	–	–	13.37	103.12
	Hangar Flats Development Rock Storage Facility (DRSF) (top)	MC2	17	Area on Development Rock Storage Facility (DRSF) Upstream of Chute	–	–	–	0.28	4.35	–	–	–	–	–	–	–	4.81	35
	Hangar Flats DRSF (face)	MC3		Chute on face of DRSF	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Hangar Flats DRSF (toe)	MC4	15	Between Chute and Hangar Flats pit	–	–	–	–	4.3	–	–	19.64	–	–	–	–	23.95	205.18
	Hangar Flats pit	MC5	15	Enhancement of existing channel below pit	–	–	–	–	2.97	–	–	–	–	–	–	–	2.97	23.01
	Below Hangar Flats pit	MC6		Enhancement of existing channel below pit	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Blowout Creek	Blowout Creek (Meadow)	BC1	1	Meadow channel upstream of boulder chute	–	–	–	–	–	–	–	–	–	–	9.8	–	9.7	27.73
	Blowout Creek (Boulder Chute)	BC2		Steep channel between meadow and alluvial fan	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Hangar Flats pit	BC3		Channel into Hangar Flats pit	–	–	–	–	–	–	–	–	–	–	–	–	–	–
EFSFSR	Processing Facility	EF1		Section upstream of confluence with Meadow Cr.	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Yellow Pine pit	EF2		Section upstream of Yellow Pine pit restoration reach	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Yellow Pine pit	EF3	11	Final stream segment replacing the temporary tunnel	–	–	–	1.94	22.29	0.92	–	–	–	–	–	–	25.15	190.31
	Yellow Pine pit	EF4		Section downstream of Yellow Pine Pit restoration reach	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Fiddle Creek	Fiddle DRSF (top)	FC1	8	Restoration upstream of boulder chute	0.19	–	–	0.37	9.75	2.82	1.75	–	–	–	–	–	14.87	118.58
	Fiddle DRSF (face)	FC2		Chute on face of DRSF	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Midnight Creek	Yellow Pine pit	MNC1		Steep reach above EFSFSR floodplain	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Yellow Pine pit	MNC2	12	Channel on top of EFSFSR floodplain	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Hennessy Creek	Yellow Pine pit	HC1		Cascade over edge of Yellow Pine Pit	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Yellow Pine pit	HC2	11	Channel on top of EFSFSR floodplain	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Garnet Creek	Processing Facility	GC1		Upstream of confluence with EFSFSR; May be too steep for habitat	–	–	–	–	–	–	–	–	–	–	–	–	–	–
West End Creek	West End DRSF (top)	WE1	7	Restoration on top of the West End DRSF	–	–	–	–	0.6	–	–	–	–	–	–	–	0.6	4.56
	West End DRSF (face)	WE2		Chute on face of DRSF	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	West End Pit (lower)	WE3		Downstream of West End Pit within mining disturbance area	–	–	–		–	–	–	–	–	–	–	–	–	–
TOTAL					**1.92**	**1.63**	**1.74**	**4.96**	**102.39**	**12.4**	**6.97**	**19.64**	**0.00**	**0.00**	**9.8**	**0.00**	**161.35**	**1,218.83**

TETRA TECH

MIDAS GOLD

Stibnite Gold Project
Stream And Wetland Restoration Concept Design
General Wetland Notes
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: LC
Drawn: JHD
Checked: LC
Approved: —

Drawing Name
General Wetland Notes

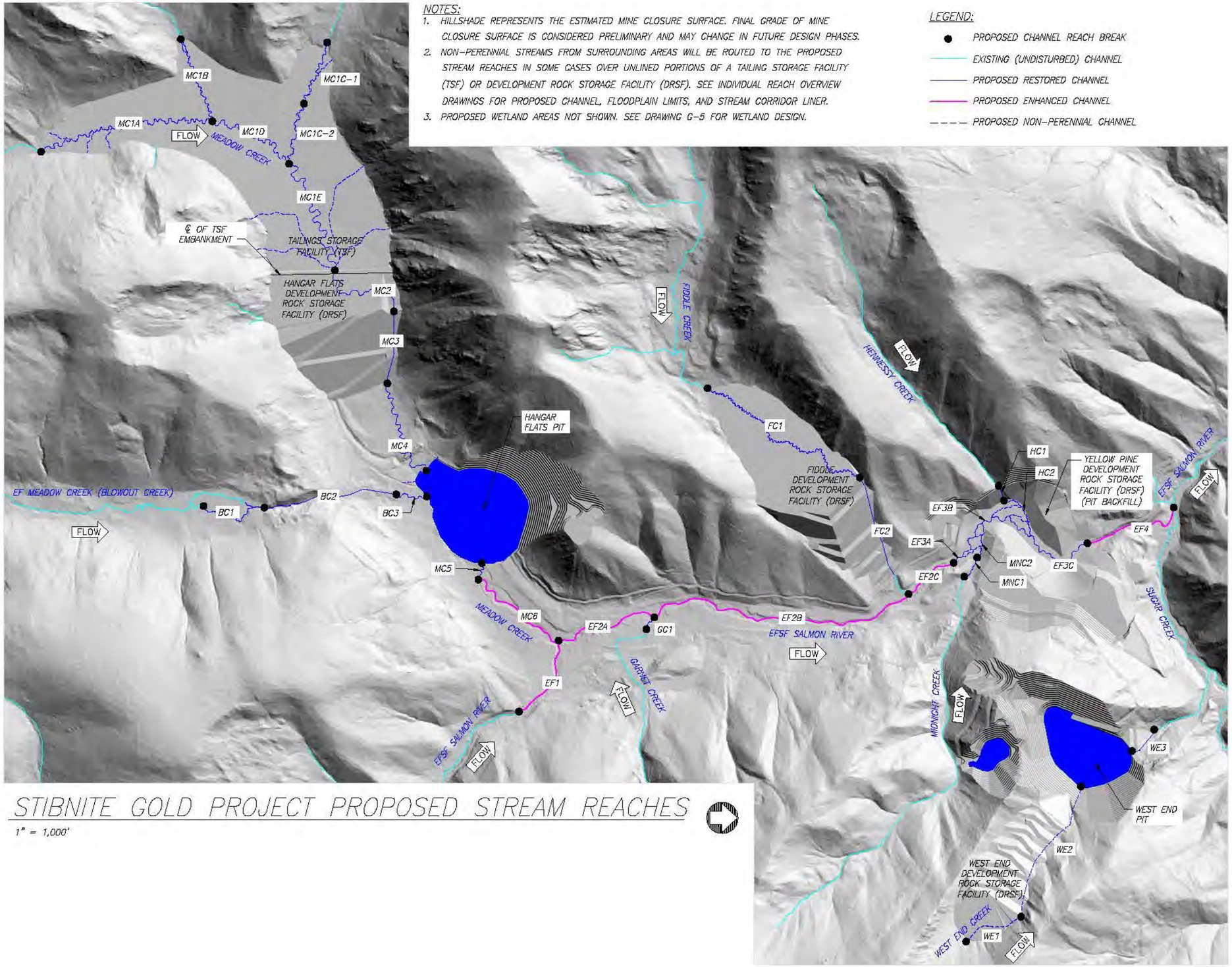
Drawing No.
G3

NOTES:

1. HILLSHADE REPRESENTS THE ESTIMATED MINE CLOSURE SURFACE. FINAL GRADE OF MINE CLOSURE SURFACE IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES.
2. NON-PERENNIAL STREAMS FROM SURROUNDING AREAS WILL BE ROUTED TO THE PROPOSED STREAM REACHES IN SOME CASES OVER UNLINED PORTIONS OF A TAILING STORAGE FACILITY (TSF) OR DEVELOPMENT ROCK STORAGE FACILITY (DRSF). SEE INDIVIDUAL REACH OVERVIEW DRAWINGS FOR PROPOSED CHANNEL, FLOODPLAIN LIMITS, AND STREAM CORRIDOR LINER.
3. PROPOSED WETLAND AREAS NOT SHOWN. SEE DRAWING G-5 FOR WETLAND DESIGN.

LEGEND:

- PROPOSED CHANNEL REACH BREAK
- EXISTING (UNDISTURBED) CHANNEL
- PROPOSED RESTORED CHANNEL
- PROPOSED ENHANCED CHANNEL
- PROPOSED NON-PERENNIAL CHANNEL



STIBNITE GOLD PROJECT PROPOSED STREAM REACHES

1" = 1,000'

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MIDAS GOLD

Stibnite Gold Project

Stream and Wetland Restoration Concept Design

Proposed Stream Reaches

Valley County, Idaho

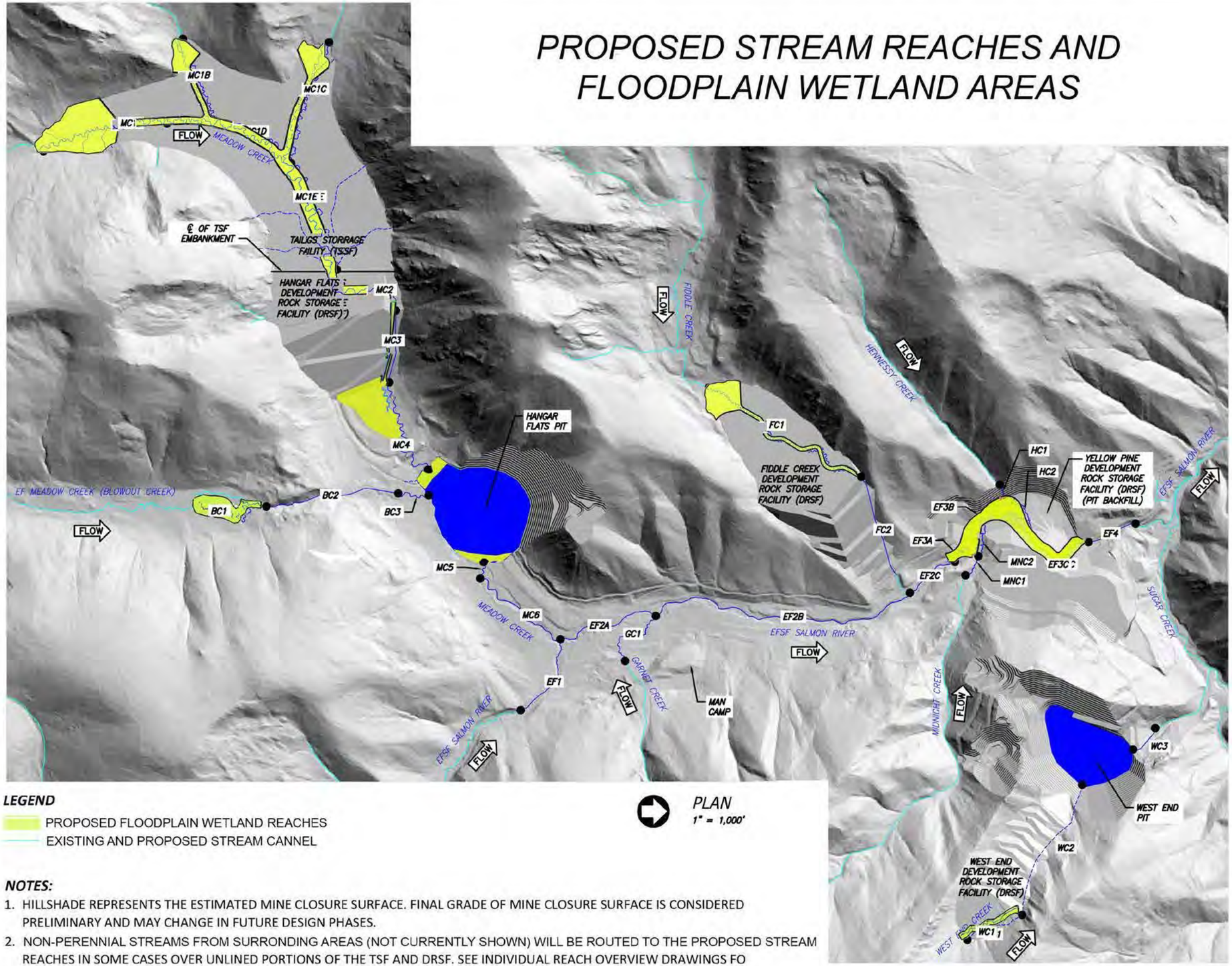
Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: --

Drawing Name
Proposed Stream Reaches

Drawing No.
G-4

PROPOSED STREAM REACHES AND FLOODPLAIN WETLAND AREAS



LEGEND

PROPOSED FLOODPLAIN WETLAND REACHES

EXISTING AND PROPOSED STREAM CANNEL

PLAN
1" = 1,000'

NOTES:

1. HILLSHADE REPRESENTS THE ESTIMATED MINE CLOSURE SURFACE. FINAL GRADE OF MINE CLOSURE SURFACE IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES.
2. NON-PERENNIAL STREAMS FROM SURRONDING AREAS (NOT CURRENTLY SHOWN) WILL BE ROUTED TO THE PROPOSED STREAM REACHES IN SOME CASES OVER UNLINED PORTIONS OF THE TSF AND DRSF. SEE INDIVIDUAL REACH OVERVIEW DRAWINGS FO PROPOSED CHANNEL FLOODPLAIN LIMITS AND LINER LIMITS.

TETRA TECH

MIDAS GOLD

Stibnite Gold Project
Stream And Wetland Restoration Concept Design
Proposed Floodplain Wetland Areas
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: LC, JHD
Drawn: JHD
Checked: LC
Approved: ---

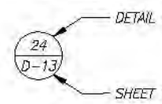
Drawing Name
Proposed Floodplain Wetland Areas

Drawing No.
G5

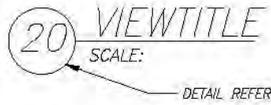
LEGEND:

- CHANNEL ALIGNMENT
- EXISTING CHANNEL
- EXISTING NON-PERENNIAL CHANNEL
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING PEM WETLAND
- EXISTING PFO WETLAND
- EXISTING PSS WETLAND
- EXISTING RELIC DAM DEMOLITION
- EXISTING ROAD
- EXISTING SEEP
- FLOW DIRECTION
- MINE OPERATIONAL DISTURBANCE LIMITS
- PROPOSED ENHANCEMENT REACH ALTERNATING BANK JOG JAMS
- PROPOSED ENHANCEMENT REACH EXISTING FEATURE
- PROPOSED ENHANCEMENT REACH CHANNEL GRADING
- PROPOSED ENHANCEMENT REACH WHOLE TREE
- PROPOSED DRSF/TSF SURFACE
- PROPOSED ENHANCED CHANNEL
- PROPOSED ENHANCED/RESTORED WETLAND
- PROPOSED ENERGY DISSIPATION BASIN
- PROPOSED FLOODPLAIN LIMITS
- PROPOSED GRADING LIMIT
- PROPOSED GROUNDWATER DISCHARGE WETLAND
- PROPOSED HIGH FLOW NON-PERENNIAL CHANNEL
- PROPOSED LAKE WATER SURFACE
- PROPOSED NON-PERENNIAL CHANNEL
- PROPOSED PAB WETLAND
- PROPOSED PEM WETLAND
- PROPOSED PFO WETLAND
- PROPOSED PSS WETLAND
- PROPOSED REACH BREAK
- PROPOSED RESTORED CHANNEL
- PROPOSED RESTORED CHANNEL (SEE REFERENCED SHEET)
- PROPOSED RIPARIAN FLOODPLAIN WETLAND
- PROPOSED ROCK GRADE CONTROL STRUCTURE
- PROPOSED STREAM CORRIDOR LINER LIMITS
- PROPOSED SURFACE WATER DIVERSION
- PROPOSED TUNNEL AND PORTAL
- PROPOSED VALLEY MARGIN WETLAND

DETAIL AND SECTION REFERENCING:



M-TCHLINE SHEET 1 ST- X+00.00 — SPECIFIES STATIONING AND SHEET NUMBER FOR CONTINUING ALIGNMENT ON NEXT OR PERVIOUS SHEET



VIEWTITLE — ON DRAWINGS WHERE ONLY A TITLE IS REQUIRED

ABBREVIATIONS:	
AC	ACRE
APPROX	APPROXIMATE
BMP	BEST MANAGEMENT PRACTICE
CF	CUBIC FOOT OR FEET
CFS	CUBIC FEET PER SECOND
℄	CENTERLINE
CP	CONTROL POINT
CY	CUBIC YARD
DIAM	DIAMETER
DRSF	DEVELOPMENT ROCK STORAGE FACILITY
EA	EACH
EL, EI	ELEVATION
EXST	EXISTING
FG	FINISHED GRADE OR GROUND
FT	FOOT OR FEET
LF	LINEAR FOOT OR FEET
LIDAR	LIGHT DETECTION AND RANGING
LS	LUMP SUM
MIN	MINUMUM
MAX	MAXIMUM
N	NORTH
NO.	NUMBER
NTS	NOT TO SCALE
OG	ORIGINAL GRADE OR GROUND
PAB	PALUSTRINE AQUATIC BED
PEM	PALUSTRINE EMERGENT
PFO	PALUSTRINE FORESTED
PLS	PURE LIVE SEED
PROP	PROPOSED
PSS	PALUSTRINE SHRUB-SCRUB
SF	SQUARE FEET
STA	STATION
SWPPP	STORM WATER POLLUTION PREVENTION PLAN
SY	SQUARE YARD OR YARDS
TSF	TAILINGS STORAGE FACILITY
TYP	TYPICAL
WL	WETLAND
"	INCH
'	FOOT OR FEET
°	DEGREE

Applied Science & Engineering
2449 S. Vista Ave. Suite B
Boise, Idaho 83705

MIDAS GOLD

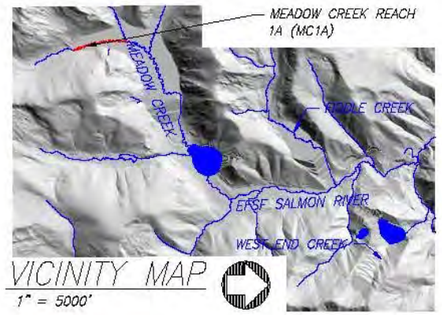
Stibnite Gold Project
Stream and Wetland Restoration Concept Design
General Legend and Abbreviations
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: ——

Drawing Name
General Legend and Abbreviations

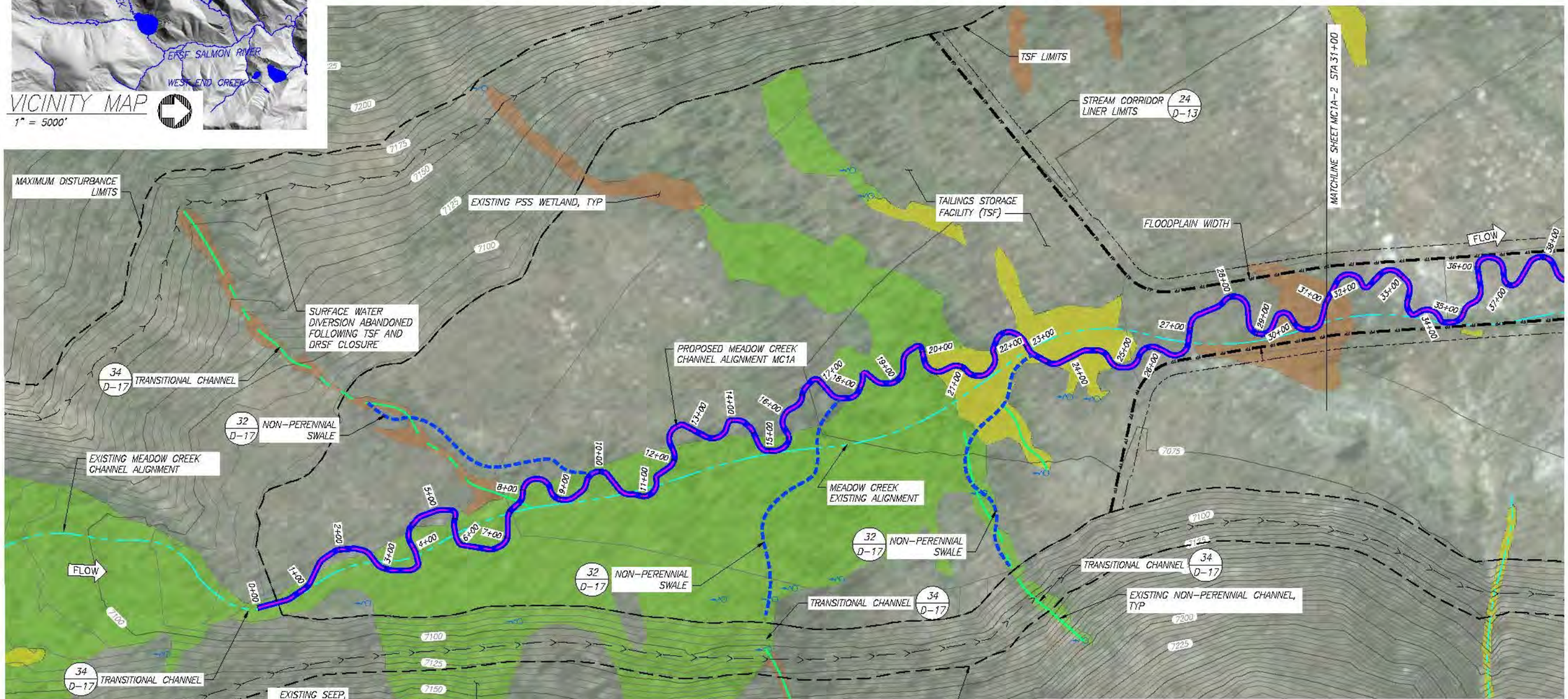
Drawing No.
G-6



VICINITY MAP
1" = 5000'

MC1A PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
MC1A	**3,589**	**5,581**	**1.6**	**0.82**	**0.53**

MC1A PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
MC1A	**5,581**	**1,423**



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON TSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE TSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. NON-PERENNIAL STREAMS FROM SURROUNDING AREAS WILL BE ROUTED TO THE PROPOSED MEADOW CREEK CHANNEL IN SOME CASES OVER UNLINED PORTIONS OF THE TSF.
4. PROPOSED WETLANDS ARE NOT SHOWN. SEE SHEETS MC1A-5 THROUGH MC1A-8 FOR WETLAND DESIGN.

MEADOW CREEK REACH 1A – RESTORATION REACH SITE OVERVIEW PLAN

0 200 400 Feet

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MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Meadow Creek - TSF - Reach MC1A
Valley County, Idaho

Draft

Date: Feb. 2019
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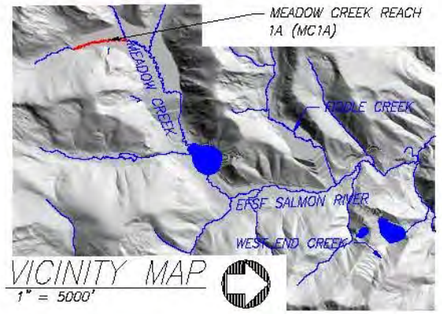
Approved: ---

Drawing Name
MC1A Overview Sheet – 1

Drawing No.
MC1A-1



VICINITY MAP
1" = 5000'

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REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
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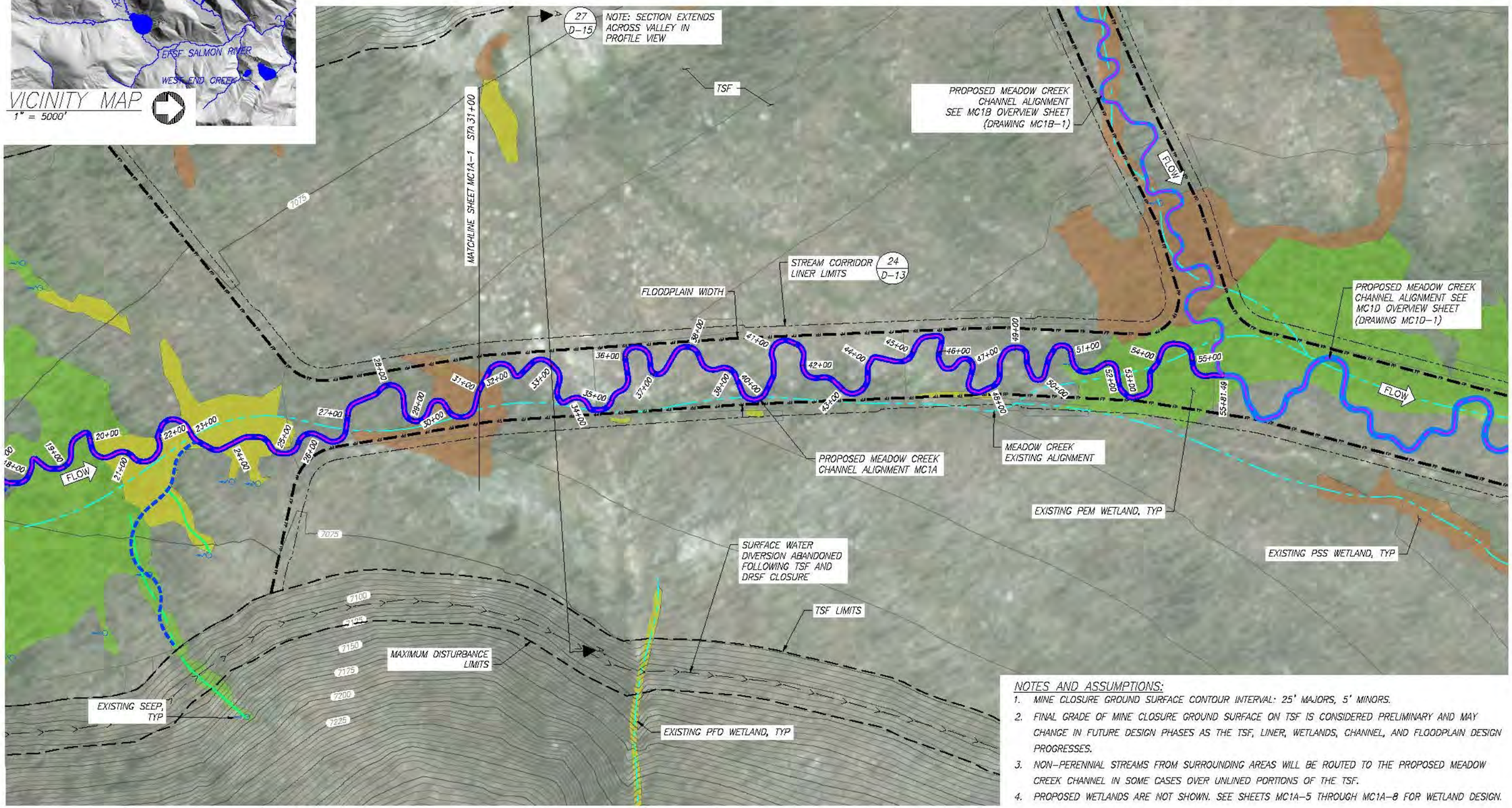
MC1A	**5,581**	**1,423**



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4. PROPOSED WETLANDS ARE NOT SHOWN. SEE SHEETS MC1A-5 THROUGH MC1A-8 FOR WETLAND DESIGN.

MEADOW CREEK REACH 1A – RESTORATION REACH
SITE OVERVIEW PLAN

0 200 400 Feet

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MIDAS GOLD

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Stream and Wetland Restoration Concept Design
Meadow Creek - TSF - Reach MC1A
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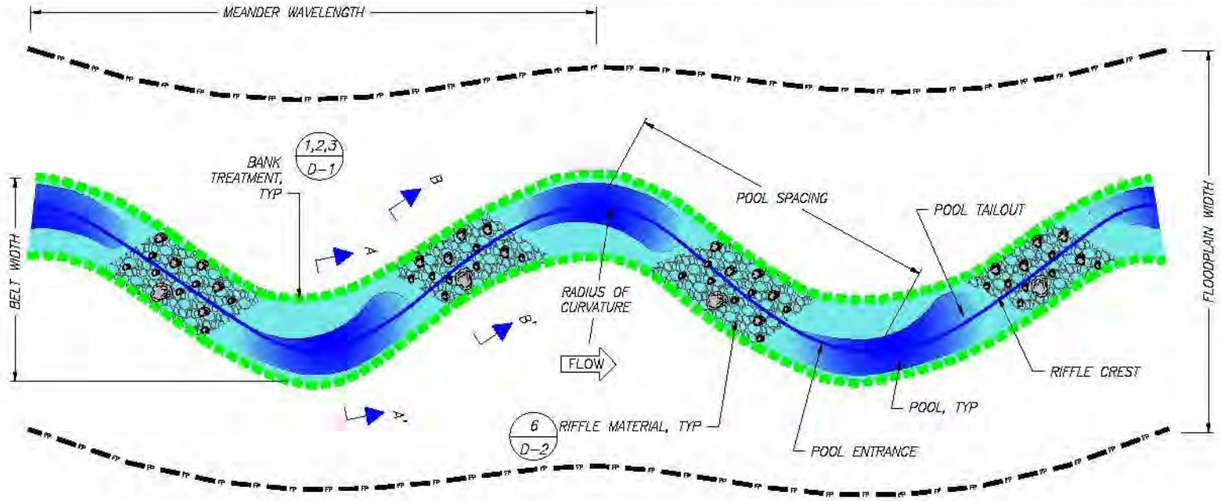
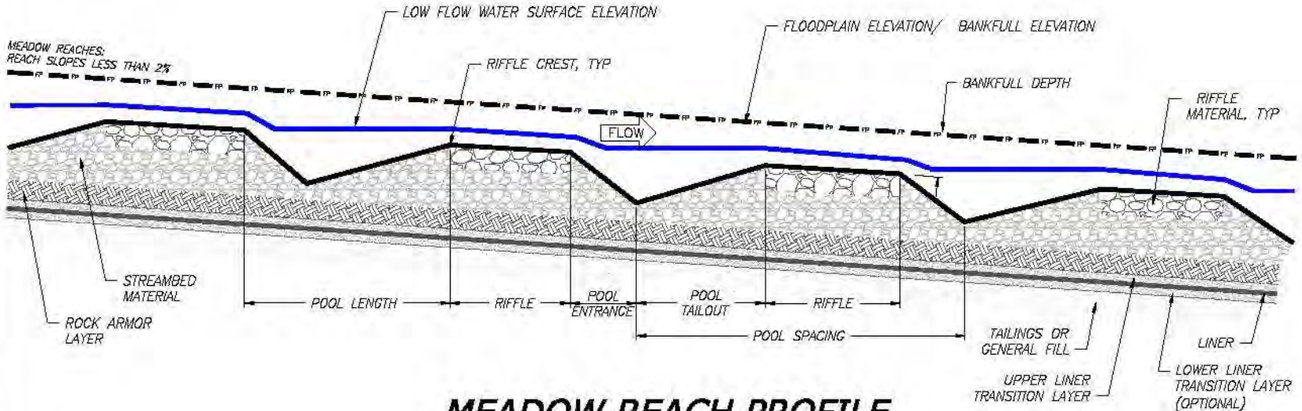
Drawing Name
MC1A Overview Sheet – 2

Drawing No.
MC1A-2



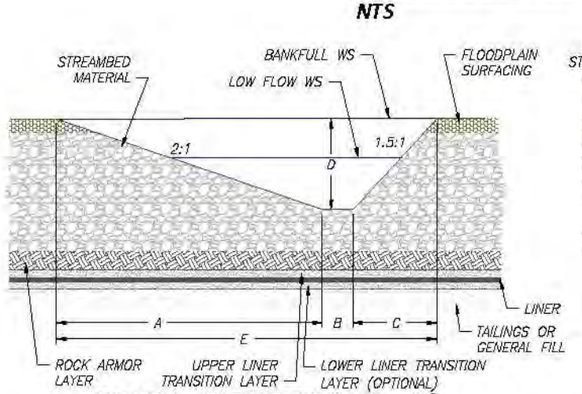
MEADOW REACH PLAN VIEW

NTS



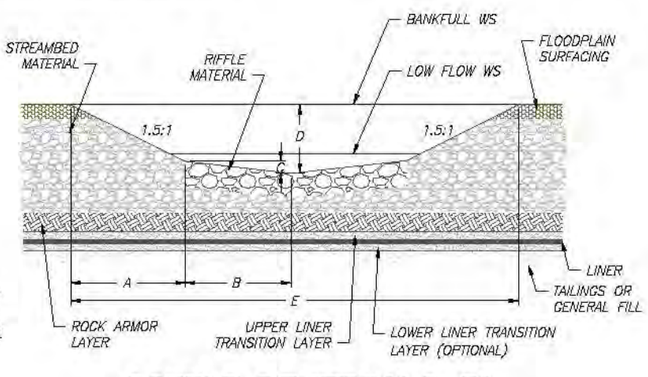
MEADOW REACH PROFILE

NTS



POOL SECTION A-A'

NTS



RIFFLE SECTION B-B'

NTS

NOTES

1. CHANNEL AND FLOODPLAIN SHALL BE CONSTRUCTED TO THE DIMENSIONS IDENTIFIED IN THE CHANNEL DEFINITION TABLES AND AT THE LOCATIONS SHOWN IN INDIVIDUAL REACH OVERVIEW PLAN SHEETS.
2. CHANNEL SIZING FOR TYPICAL POOL AND RIFFLE CROSS SECTIONS IS BASED ON CHANNEL FORMING (BANKFULL) DESIGN FLOW. DETAILED TYPICAL SECTIONS FOR OTHER STREAM HABITATS WILL BE DEVELOPED IN A FUTURE DESIGN PHASE.
3. BANK TREATMENT TYPES ARE NOT DEPICTED IN THE TYPICAL POOL AND RIFFLE SECTIONS. SEE SHEETS D-1 AND D-2 FOR BANK TREATMENT DETAILS.
4. SEE SHEETS D-3 THROUGH D-10 FOR HABITAT STRUCTURE DETAILS.
5. HABITAT STRUCTURE SPACING AND ASSOCIATED QUANTITIES ARE SUMMARIZED IN INDIVIDUAL REACH QUANTITY SHEETS.
6. SEE SHEETS D-1 AND D-20 FOR PLANTING AND SEEDING DETAILS AND PLANTING SCHEDULES.
7. SEE SHEETS D-13 THROUGH D-14 FOR TYPICAL FLOODPLAIN CROSS SECTIONS.

MC1A – MEADOW REACH
PROPOSED CHANNEL DEFINITION TABLES

PLAN TABLE

REACH ID	BANKFULL FLOW (CFS)	BANKFULL WIDTH (FT)	WIDTH/ DEPTH RATIO	AVERAGE DEPTH AT BANKFULL (FT)	MEANDER WAVELENGTH (FT)	MEANDER BELT WIDTH (FT)	RADIUS OF CURVATURE (FT)	AVG POOL SPACING (FT)	FLOODPLAIN WIDTH (FT)
MC1A	**41**	**10**	**8**	**1.2**	**95 - 125**	**50 - 105**	**15 - 60**	**40 - 125**	**130**

PROFILE TABLE

REACH ID	RIFFLE LENGTH (FT)	POOL LENGTH (FT)	POOL ENTRANCE SLOPE (%)	POOL TAILOUT SLOPE (%)
MC1A	**15 - 115**	**10 - 25**	**38 - 45**	**19 - 45**

MATERIALS TABLE

REACH ID	STREAMBED MATERIAL TYPE	STREAMBED MATERIAL AVG THICKNESS (FT)	RIFFLE MATERIAL TYPE	RIFFLE MATERIAL AVG THICKNESS (FT)	FLOODPLAIN MATERIAL TYPE	FLOODPLAIN MATERIAL AVG THICKNESS (FT)	FLOODPLAIN SURFACING TYPE	FLOODPLAIN SURFACING AVG THICKNESS (FT)
MC1A								

NOTES

1. MATERIALS TABLE TO BE DEVELOPED IN FUTURE DESIGN.
2. STREAMBED MATERIAL TYPES: S1 (D50 = XX"), S2 (D50 = XX"), S3 (D50 = XX").
3. RIFFLE MATERIAL TYPES: S1, S2, S3, R1 (D50 = XX"), R2 (D50 = XX").
4. FLOODPLAIN SURFACING MATERIAL TYPES: GROWTH MEDIA, ALGAE, HYDROMULCH, OR NONE.

SECTIONS TABLE

SECTION	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)
POOL SECTION A - A'	**6.0**	**0.5**	**4.5**	**3.0**	**11.0**
RIFFLE SECTION B - B'	**2.3**	**3.0**	**0.2**	**1.7**	**10.0**

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Stream and Wetland Restoration Conceptual Design
Meadow Creek - TSF - Reach MC1A
Valley County, Idaho

Draft

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Checked: RR
Approved: ---

Drawing Name
MC1A Typical Plan and Profile

Drawing No.
MC1A-3

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Low complexity for water managment
Stormwater Management			
BMPs and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	High complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	2,911	CY	
Floodplain Excavation (Cut)	0	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	0	CY	
Engineered Streambed Material [3]	9,178	CY	5581 LF of new channel; 3.7 FT average streambed thickness
Sorting and Stockpiling [3]	38,694	CY	Includes Engineered Streambed Material and Rock Armoring/Grade Control
Rock Armoring/ Grade Control [3]	29,516	CY	6" thick layer over the liner area
Ephemeral Swale Channel Material [3]	132	CY	1423 LF of new channel;0.5 FT gravel thickness; 5' SF XS
General Fill	179,443	CY	
Filter Material	0	CY	
Topsoil/ Growth Media [3]	56,701	CY	12" thickness within Liner Area
Liner	1,593,864	SF	Includes all material and labor
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	5,581	LF	Assumes 50% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	11,162	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	11,162	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	3,721	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	22,324	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	1,674	LF	Assumes 15% of total length of bank treatment
Brushlayer Live Cuttings	3,349	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	469	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	1,674	LF	Assumes 15% of total length of bank treatment
Brushlayer Live Cuttings	3,349	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	234	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	101	EA	2 per channel meander wave length
Riffle Material	752	CY	No. of riffles x 20' length x 10' width; 1ft thickness
Energy Dissipation Pool	0	EA	None
Boulders	0	EA	Based on bankfull width
Dissipation Pool Streambed Material	0	CY	Based on bankfull width, length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	25	EA	1 every 2 channel meander wave lengths
Foundation Logs	0	EA	0 per structure
Log with Rootwad	76	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	51	CY	2 CY per structure
Racking Material	51	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	112	EA	1 per 50 linear feet of new channel
Log with Rootwad	112	EA	1 per structure
Retaining Log	112	EA	1 per structure
Tight Radius Jam Structure	8	EA	1 every 6 channel meander wave lengths
Foundation Logs	59	EA	3 per structure
Log with Rootwad	51	EA	3 per structure
Small Woody Debris	110	CY	7 CY per structure
Racking Material	118	EA	7 per structure
Bend Jam Structure	17	EA	1 every 3 channel meander wave lengths
Foundation Logs	34	EA	2 per structure
Log with Rootwad	51	EA	3 per structure
Whole Tree	34	EA	1 per structure
Small Woody Debris	220	CY	13 CY per structure
Racking Material	254	EA	15 per structure
Sweeper Log Structure	25	EA	1 every 2 channel meander wave lengths
Whole Tree	25	EA	1 per structure
Small Woody Debris	76	CY	3 CY per structure
Racking Material	76	EA	3 per structure
Channel Spanning Jam	0	EA	None
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Wood Habitat Structure	25	EA	1 every 2 channel meander wave lengths
Log with Rootwad	101	EA	4 per structure
Small Woody Debris	76	CY	3 CY per structure
Racking Material	76	EA	3 per structure
Turning Log Structure	8	EA	1 every 6 channel meander wave lengths
Log with Rootwad	34	EA	4 per structure
Small Woody Debris	25	CY	3 CY per structure
Racking Material	25	EA	3 per structure
Boulders	17	EA	2 per structure
Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	10 per Alcove
Oxbow Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	25 per Alcove
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre, intended for anually wet areas
Zone 2	1,240	EA	4840 plants per acre
Zone 3	980	EA	3825 plants per acre
Zone 4	2,423	EA	1891 plants per acre
Seeding			
Zone 2	0.26	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.26	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	1.28	AC	5' width each side of channel; 19.02 pure live seed/AC

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MIDAS GOLD

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Stream and Wetland Restoration Concept Design
Meadow Creek - TSF - Reach MC1A
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
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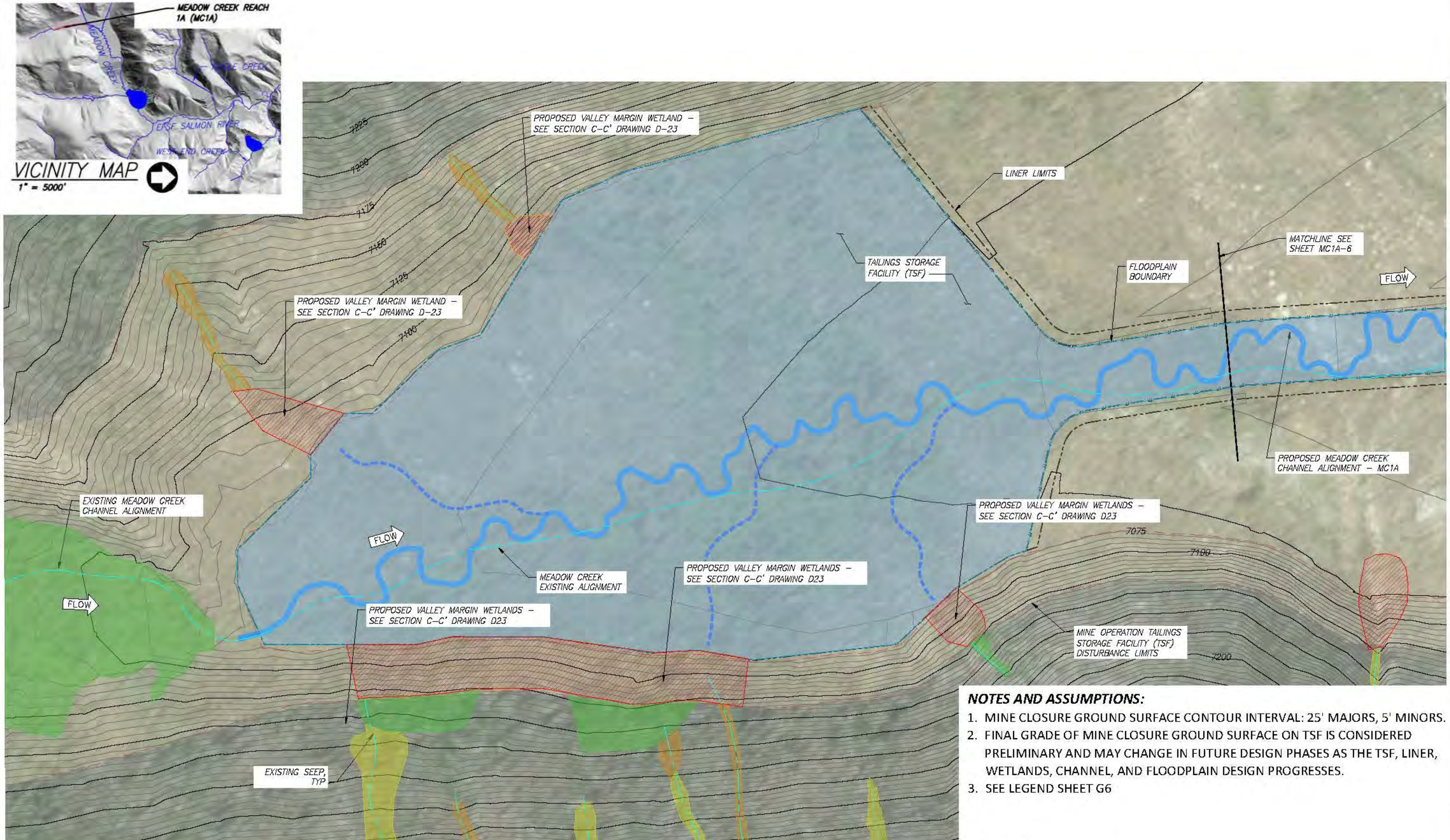
Approved: —

Drawing Name
MC1A Quantities

Drawing No.
MC1A-4



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON TSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE TSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. SEE LEGEND SHEET G6

MEADOW CREEK REACH 1A WETLANDS OVERVIEW PLAN

0 200

TETRA TECH

MIDAS GOLD

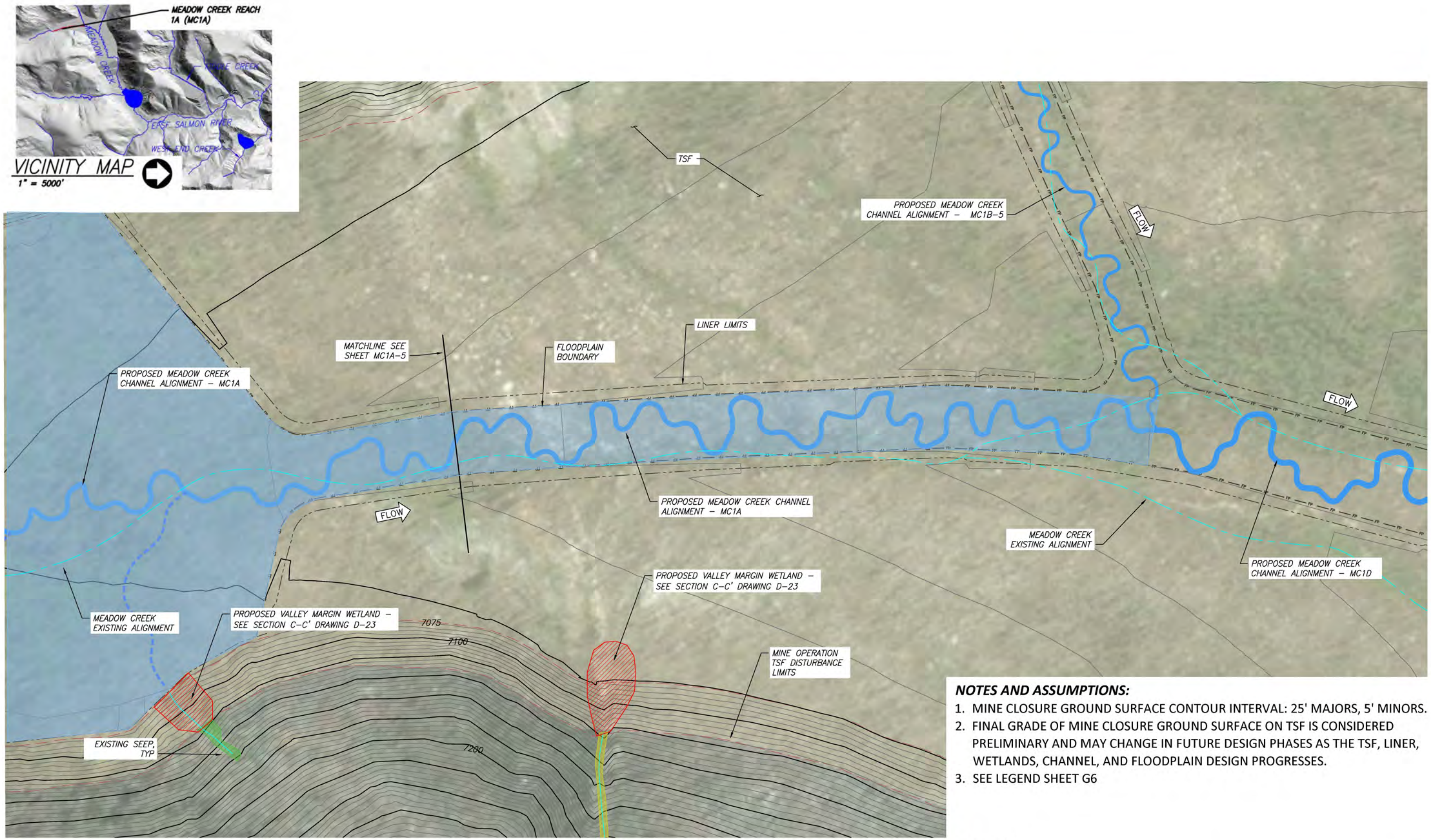
Draft

Date: Feb. 2019
Designed: LC, JHD
Drawn: JHD
Checked: LC
Approved: ––

Drawing Name
MC1A Wetland Sheet – 1

Drawing No.
MC1A–5

LOCATION: C:\USERS\JIM.DUSHIN\PICTURES\LARRY\CAD\MC1A_WETLANDS OVERVIEW.DWG PLOT DATE:2/14/2019



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MEADOW CREEK REACH 1A WETLANDS OVERVIEW PLAN

0 200

TETRA TECH

MIDAS GOLD

Draft

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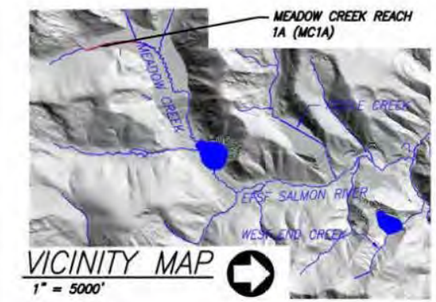
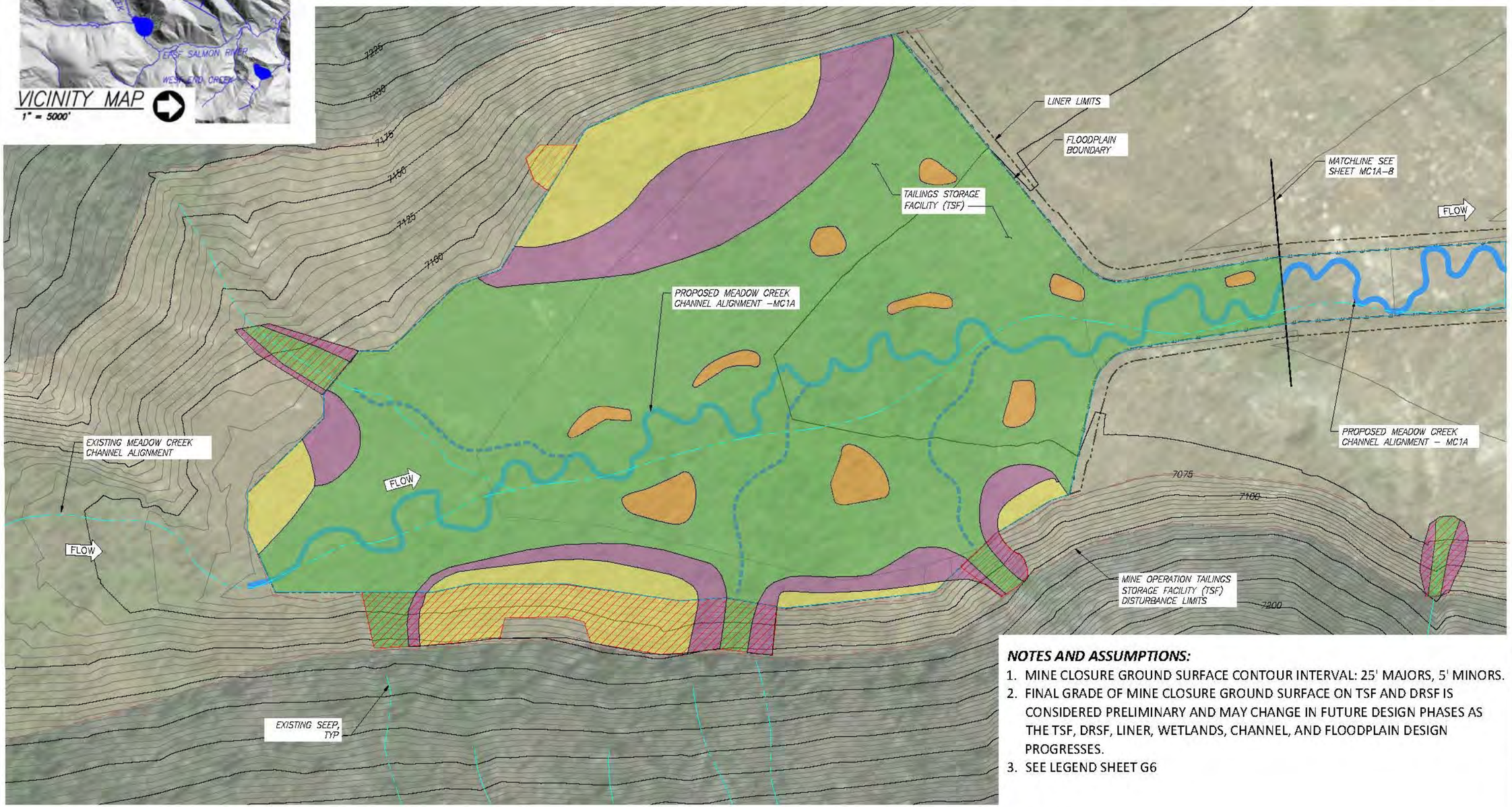
Drawing Name
MC1A Wetland Sheet – 2

Drawing No.
MC1A–6



VICINITY MAP
1" = 5000'



NOTES AND ASSUMPTIONS:

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3. SEE LEGEND SHEET G6

MEADOW CREEK REACH 1A WETLANDS PLANTING PLAN

0 200

TETRA TECH

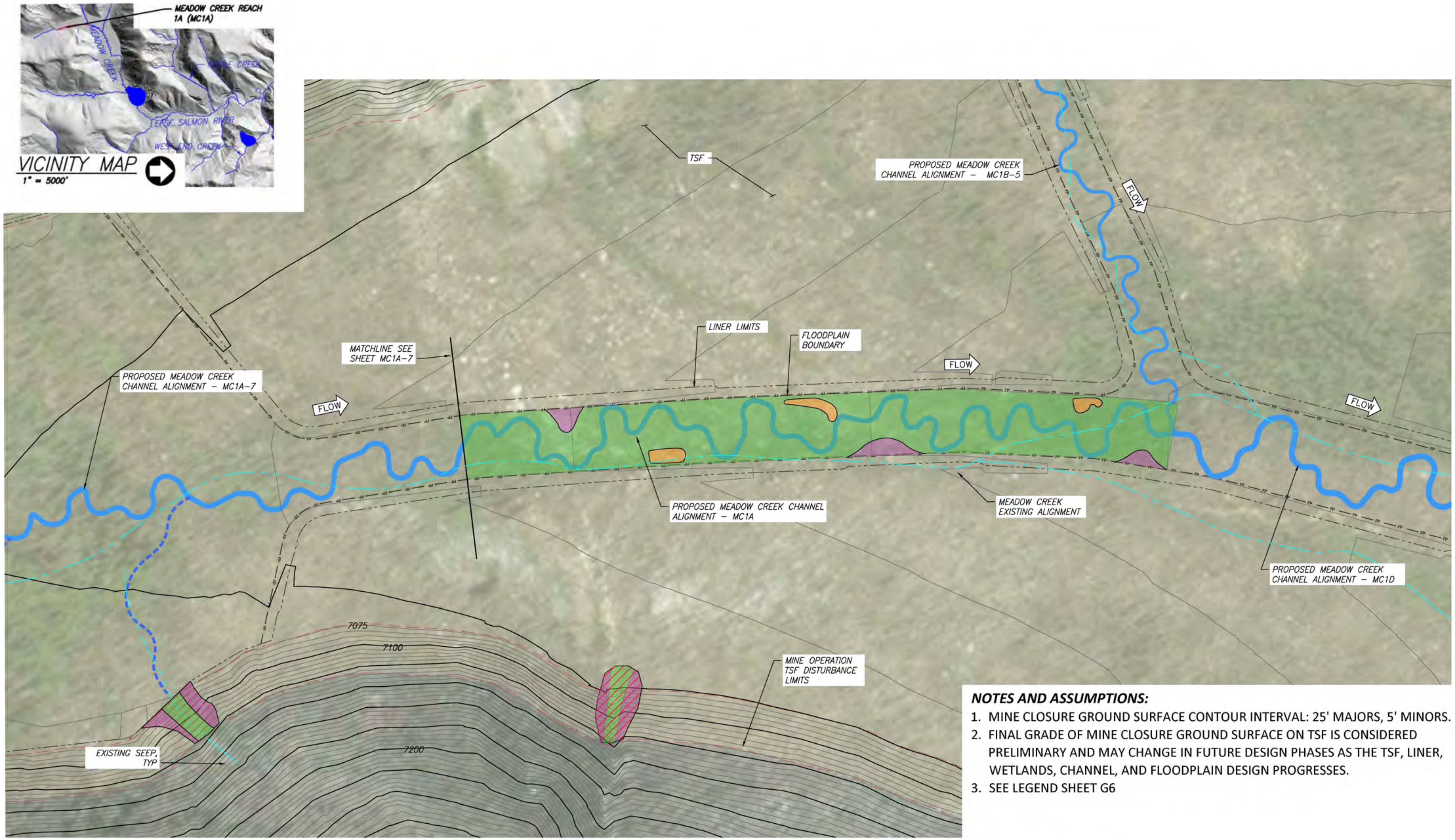
MIDAS GOLD

Draft

Date: Feb. 2019
Designed: LC, JHD
Drawn: JHD
Checked: LC
Approved: --

Drawing Name
MC1A Wetland Planting Sheet – 1

Drawing No.
MC1A–7



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3. SEE LEGEND SHEET G6

MEADOW CREEK REACH 1A WETLANDS PLANTING PLAN

TETRA TECH

MIDAS GOLD

Draft

Date: Feb. 2019
Designed: LC, JHD
Drawn: JHD
Checked: LC
Approved: ––

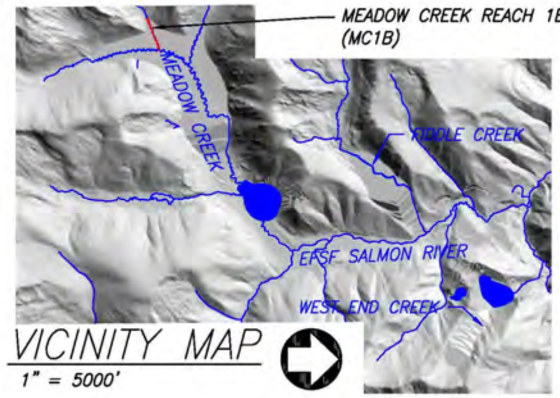
Drawing Name
MC1A Wetland Planting Sheet – 2

Drawing No.
MC1A–8

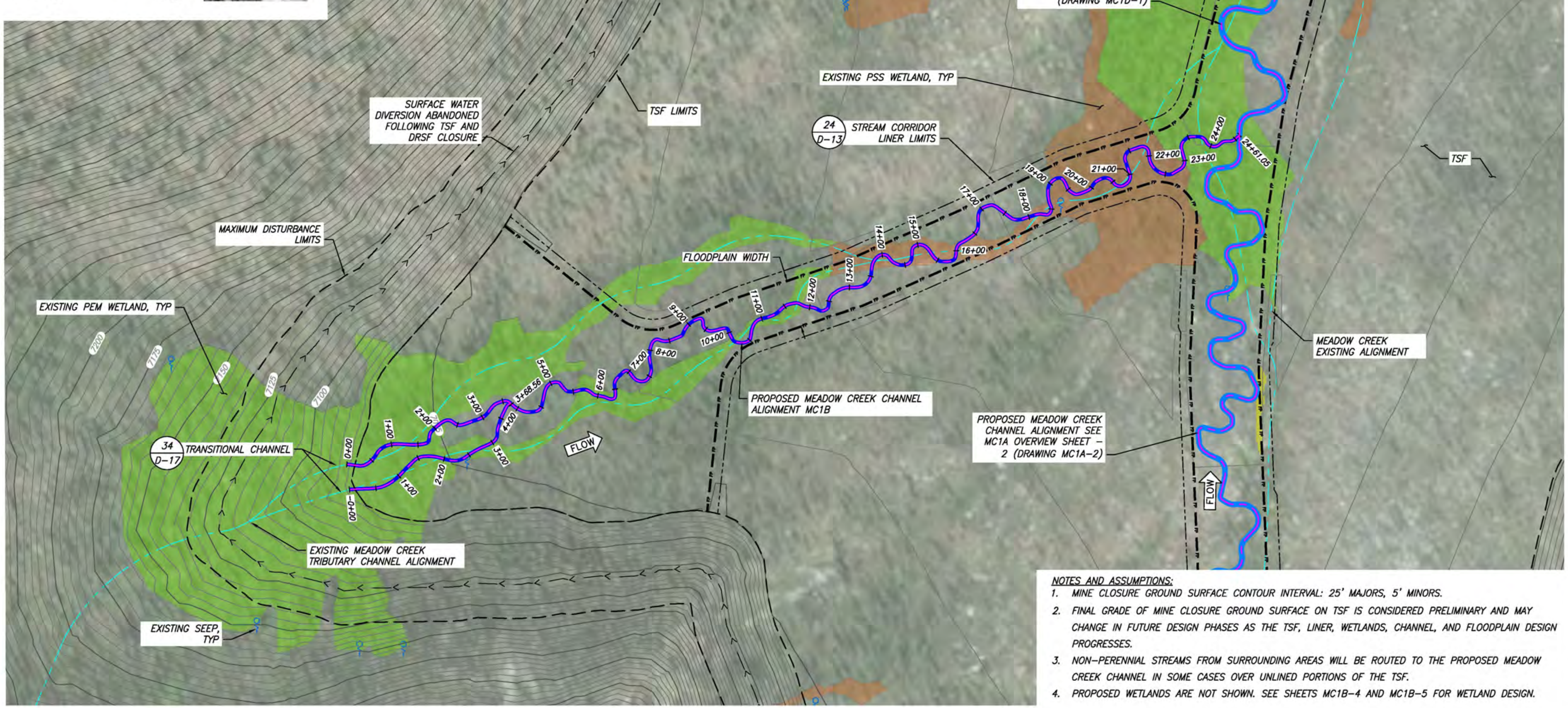
LOCATION: C:\USERS\JIM.DUSHIN\PICTURES\LARRY\CAD\MC1A_WETLANDS PLANTINGS.DWG PLOT DATE: 2/14/2019

MC1B PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
MC1B	1,701	2,461	1.4	1.32	0.91

MC1B PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
MC1B	2,828	0



VICINITY MAP
1" = 5000'



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4. PROPOSED WETLANDS ARE NOT SHOWN. SEE SHEETS MC1B-4 AND MC1B-5 FOR WETLAND DESIGN.

MEADOW CREEK REACH 1B – RESTORATION REACH SITE OVERVIEW PLAN

0 200 400 Feet

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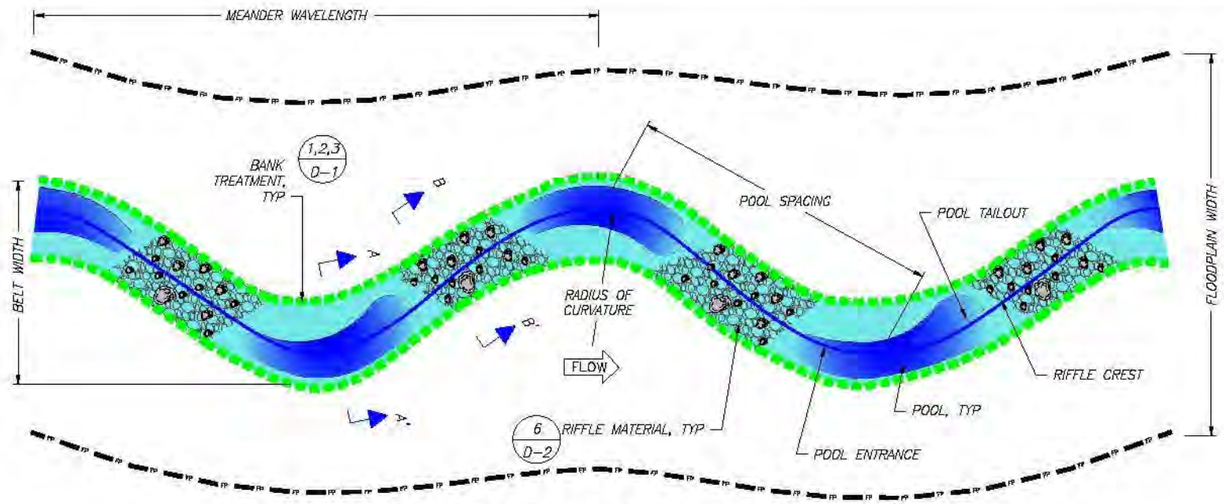
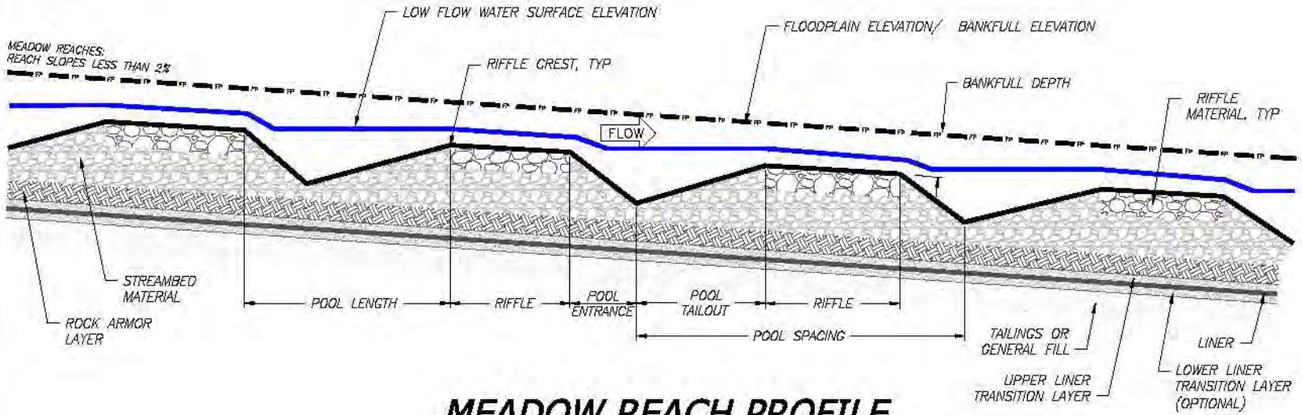
Drawing Name
MC1B Overview Sheet

Drawing No.
MC1B–1



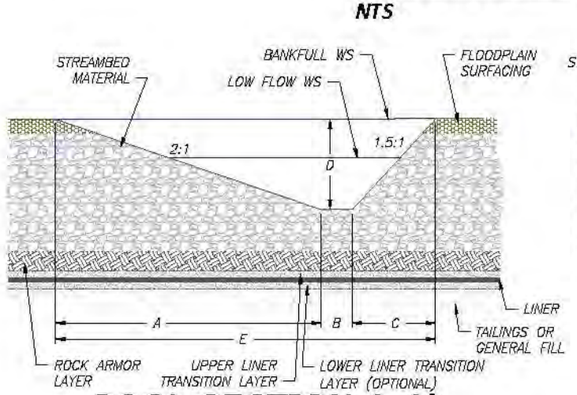
MEADOW REACH PLAN VIEW

NTS



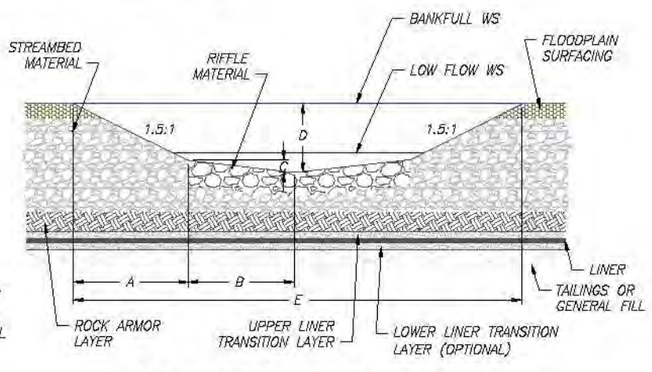
MEADOW REACH PROFILE

NTS



POOL SECTION A-A'

NTS



RIFFLE SECTION B-B'

NTS

NOTES

1. CHANNEL AND FLOODPLAIN SHALL BE CONSTRUCTED TO THE DIMENSIONS IDENTIFIED IN THE CHANNEL DEFINITION TABLES AND AT THE LOCATIONS SHOWN IN INDIVIDUAL REACH OVERVIEW PLAN SHEETS.
2. CHANNEL SIZING FOR TYPICAL POOL AND RIFFLE CROSS SECTIONS IS BASED ON CHANNEL FORMING (BANKFULL) DESIGN FLOW. DETAILED TYPICAL SECTIONS FOR OTHER STREAM HABITATS WILL BE DEVELOPED IN A FUTURE DESIGN PHASE.
3. BANK TREATMENT TYPES ARE NOT DEPICTED IN THE TYPICAL POOL AND RIFFLE SECTIONS. SEE SHEETS D-1 AND D-2 FOR BANK TREATMENT DETAILS.
4. SEE SHEETS D-3 THROUGH D-10 FOR HABITAT STRUCTURE DETAILS.
5. HABITAT STRUCTURE SPACING AND ASSOCIATED QUANTITIES ARE SUMMARIZED IN INDIVIDUAL REACH QUANTITY SHEETS.
6. SEE SHEETS D-1 AND D-20 FOR PLANTING AND SEEDING DETAILS AND PLANTING SCHEDULES.
7. SEE SHEETS D-13 THROUGH D-14 FOR TYPICAL FLOODPLAIN CROSS SECTIONS.

MC1B – MEADOW REACH
PROPOSED CHANNEL DEFINITION TABLES

PLAN TABLE

REACH ID	BANKFULL FLOW (CFS)	BANKFULL WIDTH (FT)	WIDTH/ DEPTH RATIO	AVERAGE DEPTH AT BANKFULL (FT)	MEANDER WAVELENGTH (FT)	MEANDER BELT WIDTH (FT)	RADIUS OF CURVATURE (FT)	AVG POOL SPACING (FT)	FLOODPLAIN WIDTH (FT)
MC1B	**19**	**6**	**7**	**0.9**	**60 - 80**	**30 - 70**	**10 - 40**	**25 - 80**	**90**

PROFILE TABLE

REACH ID	RIFFLE LENGTH (FT)	POOL LENGTH (FT)	POOL ENTRANCE SLOPE (%)	POOL TAILOUT SLOPE (%)
MC1B	**10 - 75**	**5 - 15**	**44 - 45**	**22 - 53**

MATERIALS TABLE

REACH ID	STREAMBED MATERIAL TYPE	STREAMBED MATERIAL AVG THICKNESS (FT)	RIFFLE MATERIAL TYPE	RIFFLE MATERIAL AVG THICKNESS (FT)	FLOODPLAIN MATERIAL TYPE	FLOODPLAIN MATERIAL AVG THICKNESS (FT)	FLOODPLAIN SURFACING TYPE	FLOODPLAIN SURFACING AVG THICKNESS (FT)
MC1B								

NOTES

1. MATERIALS TABLE TO BE DEVELOPED IN FUTURE DESIGN.
2. STREAMBED MATERIAL TYPES: S1 (D50 = XX"), S2 (D50 = XX"), S3 (D50 = XX").
3. RIFFLE MATERIAL TYPES: S1, S2, S3, R1 (D50 = XX"), R2 (D50 = XX").
4. FLOODPLAIN SURFACING MATERIAL TYPES: GROWTH MEDIA, ALGAE, HYDROMULCH, OR NONE.

SECTIONS TABLE

SECTION	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)
POOL SECTION A - A'	**4.5**	**0.2**	**3.4**	**2.3**	**8.1**
RIFFLE SECTION B - B'	**1.8**	**2.0**	**0.2**	**1.4**	**6.4**

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MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Meadow Creek - TSF - Reach MC1B
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: --

Drawing Name
MC1B Typical Plan and Profile

Drawing No.
MC1B–2

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Low complexity for water managment
Stormwater Management			
BMPs and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	High complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	726	CY	
Floodplain Excavation (Cut)	0	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	0	CY	
Engineered Streambed Material [3]	2,332	CY	2828 LF of new channel; 2.65 FT average streambed thickness
Sorting and Stockpiling [3]	9,735	CY	Includes Engineered Streambed Material and Rock Armoring/Grade Control
Rock Armoring/ Grade Control [3]	7,403	CY	6" thick layer over the liner area
Ephemeral Swale Channel Material	0	CY	
General Fill	29,570	CY	
Filter Material	0	CY	
Topsoil/ Growth Media [3]	14,136	CY	12" thickness within Liner Area
Liner	399,783	SF	Includes all material and labor
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	2,828	LF	Assumes 50% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	5,656	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	5,656	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	1,885	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	11,312	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	848	LF	Assumes 15% of total length of bank treatment
Brushlayer Live Cuttings	1,697	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	238	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	848	LF	Assumes 15% of total length of bank treatment
Brushlayer Live Cuttings	1,697	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	119	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	81	EA	2 per channel meander wave length
Riffle Material	599	CY	No. of riffles x 20' length x 10' width; 1ft thickness
Energy Dissipation Pool	0	EA	None
Boulders	0	EA	Based on bankfull width
Dissipation Pool Streambed Material	0	CY	Based on bankfull width, length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	20	EA	1 every 2 channel meander wave lengths
Foundation Logs	0	EA	0 per structure
Log with Rootwad	61	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	40	CY	2 CY per structure
Racking Material	40	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	57	EA	1 per 50 linear feet of new channel
Log with Rootwad	57	EA	1 per structure
Retaining Log	57	EA	1 per structure
Tight Radius Jam Structure	7	EA	1 every 6 channel meander wave lengths
Foundation Logs	47	EA	3 per structure
Log with Rootwad	40	EA	3 per structure
Small Woody Debris	88	CY	7 CY per structure
Racking Material	94	EA	7 per structure
Bend Jam Structure	13	EA	1 every 3 channel meander wave lengths
Foundation Logs	27	EA	2 per structure
Log with Rootwad	40	EA	3 per structure
Whole Tree	27	EA	1 per structure
Small Woody Debris	175	CY	13 CY per structure
Racking Material	202	EA	15 per structure
Sweeper Log Structure	20	EA	1 every 2 channel meander wave lengths
Whole Tree	20	EA	1 per structure
Small Woody Debris	61	CY	3 CY per structure
Racking Material	61	EA	3 per structure
Channel Spanning Jam	0	EA	None
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Wood Habitat Structure	20	EA	1 every 2 channel meander wave lengths
Log with Rootwad	81	EA	4 per structure
Small Woody Debris	61	CY	3 CY per structure
Racking Material	61	EA	3 per structure
Turning Log Structure	7	EA	1 every 6 channel meander wave lengths
Log with Rootwad	27	EA	4 per structure
Small Woody Debris	20	CY	3 CY per structure
Racking Material	20	EA	3 per structure
Boulders	13	EA	2 per structure
Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	10 per Alcove
Oxbow Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	25 per Alcove
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre, intended for anually wet areas
Zone 2	628	EA	4840 plants per acre
Zone 3	497	EA	3825 plants per acre
Zone 4	1,228	EA	1891 plants per acre
Seeding			
Zone 2	0.13	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.13	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	0.65	AC	5' width each side of channel; 19.02 pure live seed/AC

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MIDAS GOLD

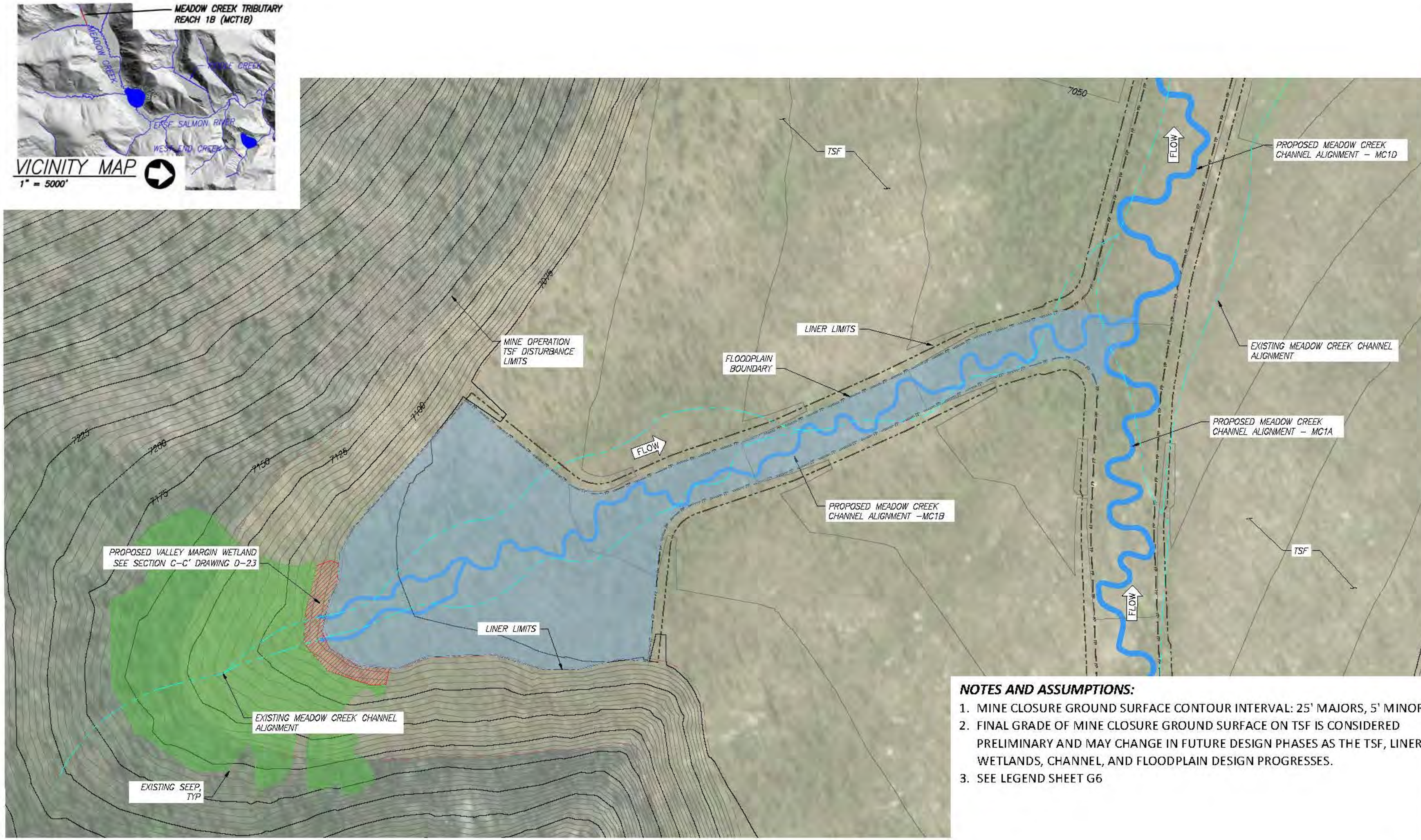
Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Meadow Creek - TSF - Reach MC1B
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: ---

Drawing Name
MC1B Quantities

Drawing No.
MC1B-3



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON TSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE TSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. SEE LEGEND SHEET G6

MEADOW CREEK REACH 1B WETLANDS OVERVIEW PLAN

0 200

TETRA TECH

MIDAS GOLD

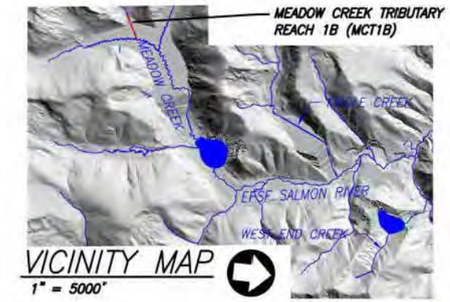
Draft

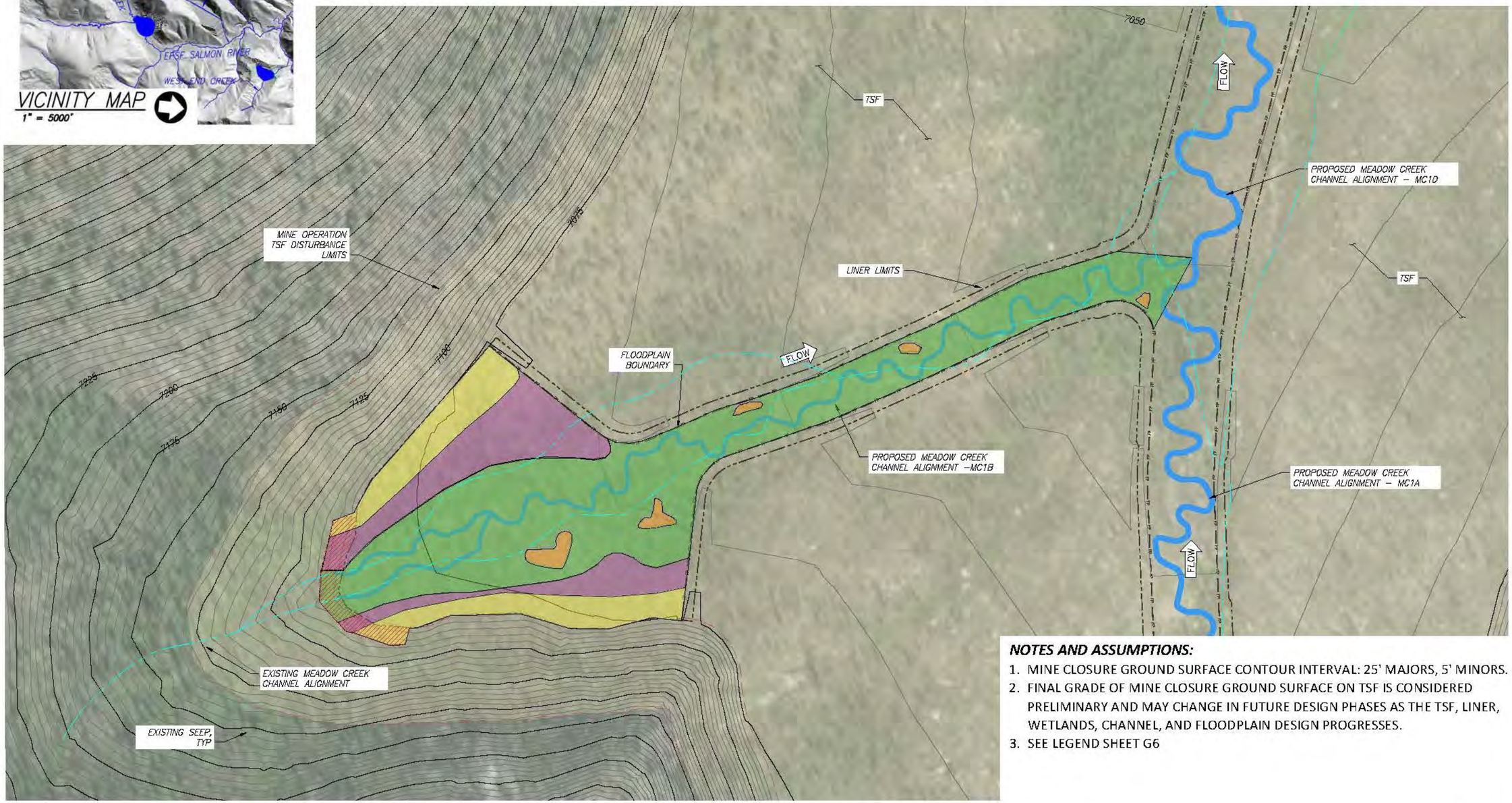
Date: Feb. 2019
Designed: LC, JHD
Drawn: JHD
Checked: LC
Approved: ––

Drawing Name
MC1B Wetland Sheet

Drawing No.
MC1B–4

LOCATION: C:\USERS\JN.DUSHIN\PICTURES\LARRY\CAD\MC1B_WETLANDS OVERVIEW.DWG PLOT DATE: 2/14/2019





NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON TSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE TSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. SEE LEGEND SHEET G6

MEADOW CREEK REACH 1B WETLANDS PLANTING PLAN

0 200

TETRA TECH

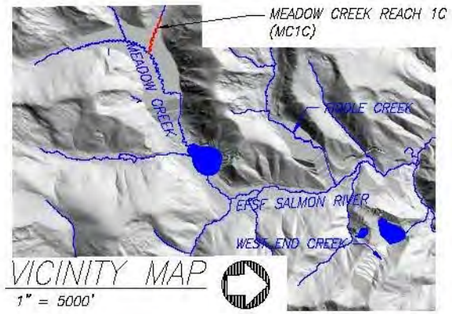
MIDAS GOLD

Draft

Date: Feb. 2019
Designed: LC, JHD
Drawn: JHD
Checked: LC
Approved: ---

Drawing Name
MC1B Wetland Planting Sheet

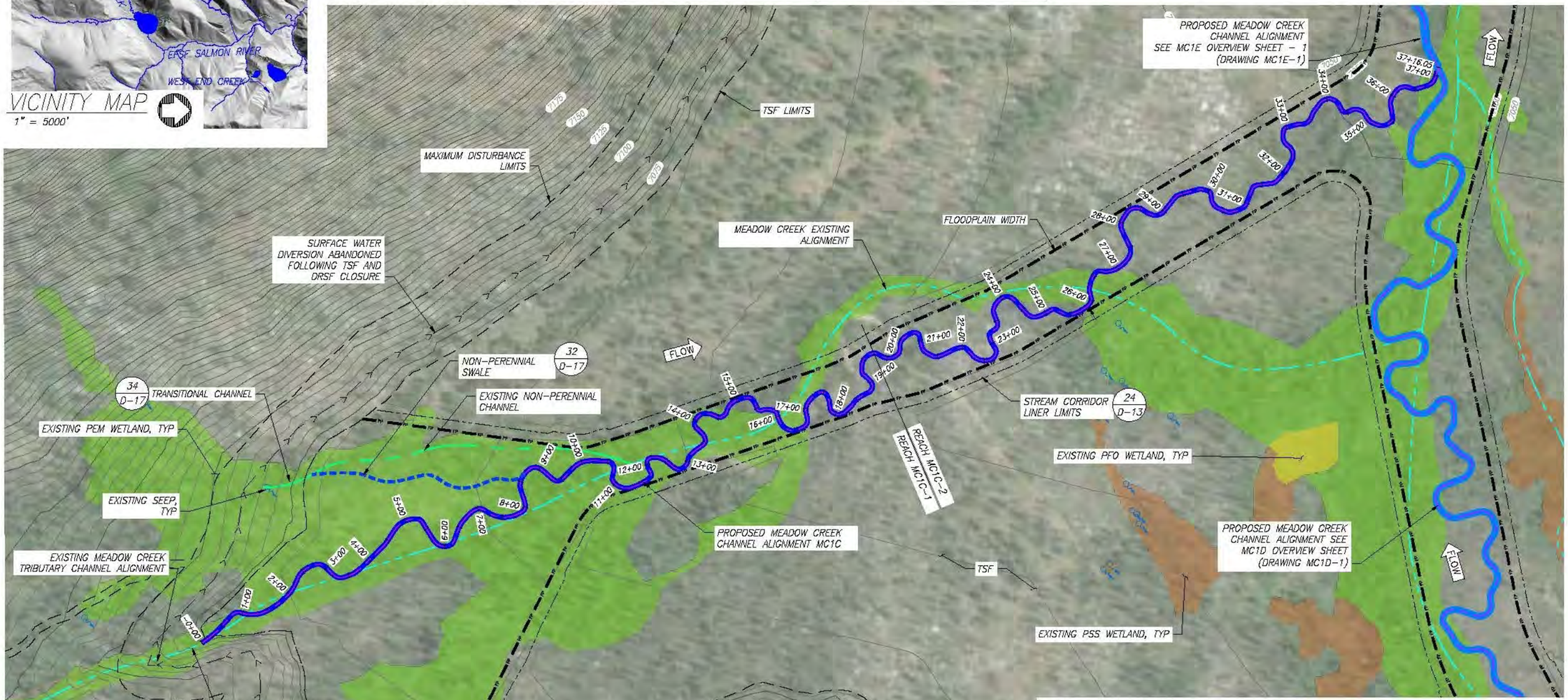
Drawing No.
MC1B–5



VICINITY MAP
1" = 5000'

MC1C PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
MC1C-1	**1,383**	**1,980**	**1.4**	**1.26**	**0.88**
MC1C-2	**1,190**	**1,736**	**1.5**	**0.44**	**0.30**

MC1C PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
MC1C	**3,716**	**417**



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON TSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE TSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. NON–PERENNIAL STREAMS FROM SURROUNDING AREAS WILL BE ROUTED TO THE PROPOSED MEADOW CREEK CHANNEL IN SOME CASES OVER UNLINED PORTIONS OF THE TSF.
4. PROPOSED WETLANDS ARE NOT SHOWN. SEE SHEET MC1C–4 AND MC1C–5 FOR WETLAND DESIGN.

MEADOW CREEK REACH 1C – RESTORATION REACH SITE OVERVIEW PLAN

0 200 400 Feet

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MIDAS GOLD

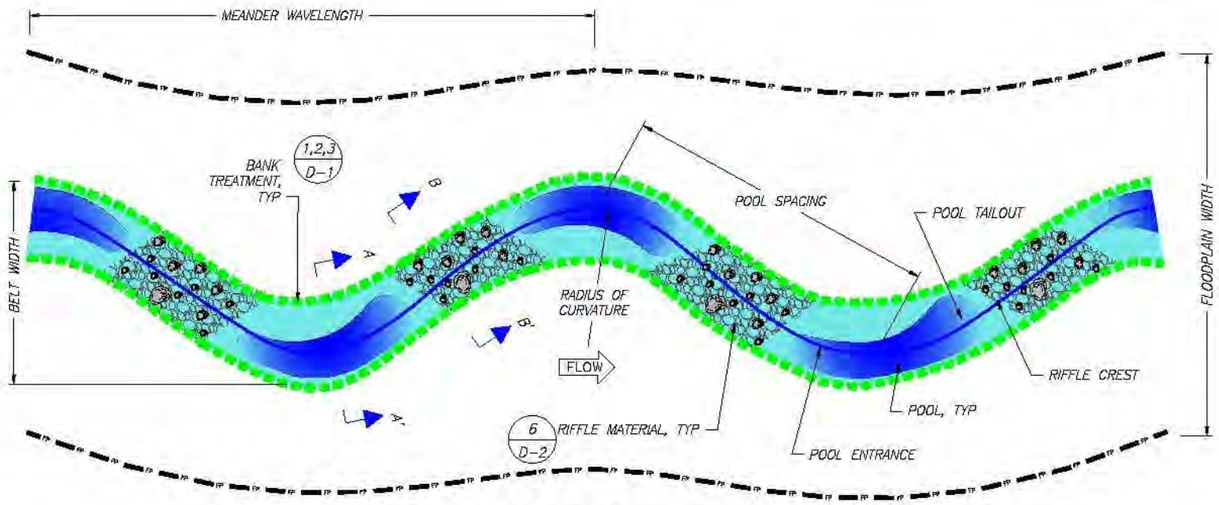
Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Meadow Creek - TSF - Reach MC1C
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: --

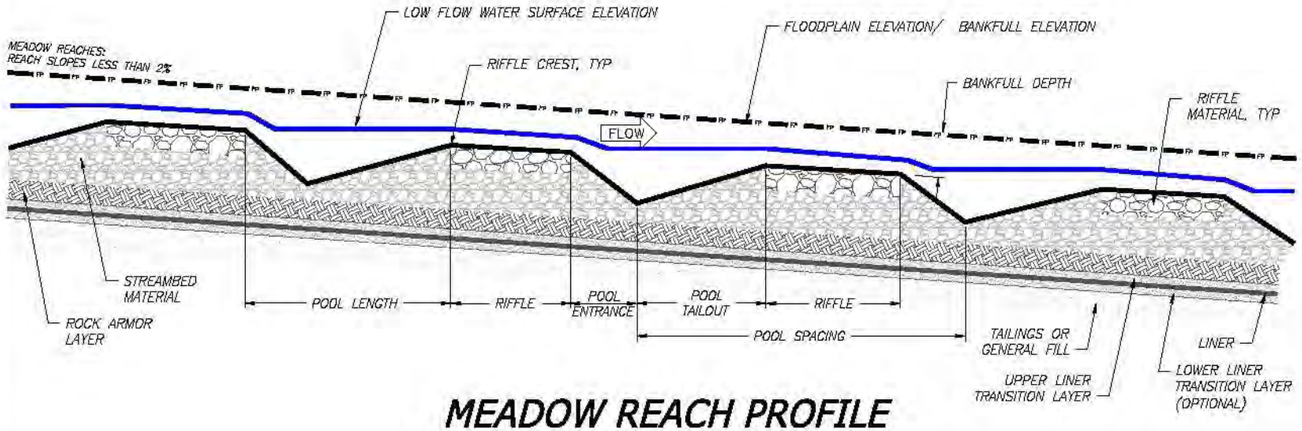
Drawing Name
MC1C Overview Sheet

Drawing No.
MC1C–1



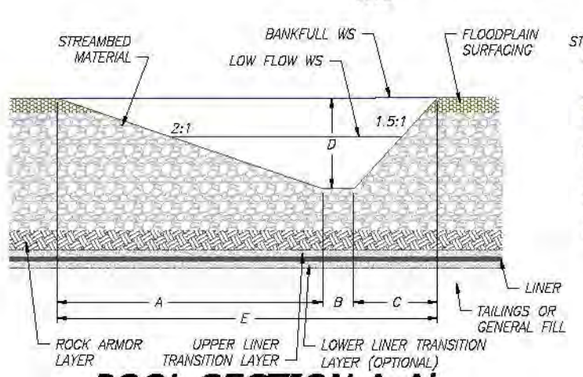
MEADOW REACH PLAN VIEW

NTS



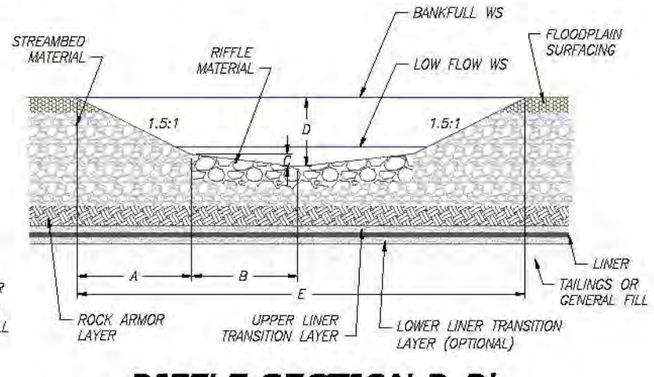
MEADOW REACH PROFILE

NTS



POOL SECTION A-A'

NTS



RIFFLE SECTION B-B'

NTS

NOTES

1. CHANNEL AND FLOODPLAIN SHALL BE CONSTRUCTED TO THE DIMENSIONS IDENTIFIED IN THE CHANNEL DEFINITION TABLES AND AT THE LOCATIONS SHOWN IN INDIVIDUAL REACH OVERVIEW PLAN SHEETS.
2. CHANNEL SIZING FOR TYPICAL POOL AND RIFFLE CROSS SECTIONS IS BASED ON CHANNEL FORMING (BANKFULL) DESIGN FLOW. DETAILED TYPICAL SECTIONS FOR OTHER STREAM HABITATS WILL BE DEVELOPED IN A FUTURE DESIGN PHASE.
3. BANK TREATMENT TYPES ARE NOT DEPICTED IN THE TYPICAL POOL AND RIFFLE SECTIONS. SEE SHEETS D-1 AND D-2 FOR BANK TREATMENT DETAILS.
4. SEE SHEETS D-3 THROUGH D-10 FOR HABITAT STRUCTURE DETAILS.
5. HABITAT STRUCTURE SPACING AND ASSOCIATED QUANTITIES ARE SUMMARIZED IN INDIVIDUAL REACH QUANTITY SHEETS.
6. SEE SHEETS D-1 AND D-20 FOR PLANTING AND SEEDING DETAILS AND PLANTING SCHEDULES.
7. SEE SHEETS D-13 THROUGH D-14 FOR TYPICAL FLOODPLAIN CROSS SECTIONS.

MC1C – MEADOW REACH
PROPOSED CHANNEL DEFINITION TABLES

PLAN TABLE

REACH ID	BANKFULL FLOW (CFS)	BANKFULL WIDTH (FT)	WIDTH/ DEPTH RATIO	AVERAGE DEPTH AT BANKFULL (FT)	MEANDER WAVELENGTH (FT)	MEANDER BELT WIDTH (FT)	RADIUS OF CURVATURE (FT)	AVG POOL SPACING (FT)	FLOODPLAIN WIDTH (FT)
MC1C-1	30	8	8	1.0	80 - 105	40 - 80	10 - 50	35 - 105	100
MC1C-2	30	9	8	1.2	90 - 115	45 - 105	10 - 50	35 - 115	130

PROFILE TABLE

REACH ID	RIFFLE LENGTH (FT)	POOL LENGTH (FT)	POOL ENTRANCE SLOPE (%)	POOL TAILOUT SLOPE (%)
MC1C-1	15 - 95	10 - 20	38 - 45	19 - 45
MC1C-2	15 - 105	10 - 20	41 - 45	20 - 49

MATERIALS TABLE

REACH ID	STREAMBED MATERIAL TYPE	STREAMBED MATERIAL AVG THICKNESS (FT)	RIFFLE MATERIAL TYPE	RIFFLE MATERIAL AVG THICKNESS (FT)	FLOODPLAIN MATERIAL TYPE	FLOODPLAIN MATERIAL AVG THICKNESS (FT)	FLOODPLAIN SURFACING TYPE	FLOODPLAIN SURFACING AVG THICKNESS (FT)
MC1C-1								
MC1C-2								

NOTES

1. MATERIALS TABLE TO BE DEVELOPED IN FUTURE DESIGN.
2. STREAMBED MATERIAL TYPES: S1 (D50 = XX"), S2 (D50 = XX"), S3 (D50 = XX").
3. RIFFLE MATERIAL TYPES: S1, S2, S3, R1 (D50 = XX"), R2 (D50 = XX").
4. FLOODPLAIN SURFACING MATERIAL TYPES: GROWTH MEDIA, ALGAE, HYDROMULCH, OR NONE.

SECTIONS TABLE

SECTION	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)
MC1C-1 POOL SECTION A-A'	5.0	0.4	3.8	2.5	9.1
MC1C-1 RIFFLE SECTION B-B'	1.9	2.4	0.2	1.5	8.3
MC1C-2 POOL SECTION A-A'	6.0	0.6	4.5	3.0	11.1
MC1C-2 RIFFLE SECTION B-B'	2.2	2.5	0.3	1.7	9.2

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MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Meadow Creek - TSF - Reach MC1C
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: --

Drawing Name
MC1C Typical Plan and Profile

Drawing No.
MC1C-2

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Low complexity for water managment
Stormwater Management			
BMP's and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	High complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	1,346	CY	
Floodplain Excavation (Cut)	0	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	0	CY	
Engineered Streambed Material [3]	4,253	CY	3716 LF of new channel, 3 FT average streambed thickness
Sorting and Stockpiling [3]	14,982	CY	Includes Engineered Streambed Material and Rock Armoring/Grade Control
Rock Armoring/ Grade Control [3]	10,729	CY	6" thick layer over the liner area
Ephemeral Swale Channel Material [3]	39	CY	417 LF of new channel;0.5 FT gravel thickness; 2' SF XS
General Fill	49,430	CY	
Filter Material	0	CY	
Topsoil/ Growth Media [3]	20,238	CY	12" thickness within Liner Area
Liner	579,353	SF	Includes all material and labor
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	3,716	LF	Assumes 50% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	7,432	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	7,432	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	2,477	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	14,864	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	1,115	LF	Assumes 15% of total length of bank treatment
Brushlayer Live Cuttings	2,230	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	312	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	1,115	LF	Assumes 15% of total length of bank treatment
Brushlayer Live Cuttings	2,230	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	156	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	71	EA	2 per channel meander wave length
Riffle Material	524	CY	No. of riffles x 20' length x 10' width; 1ft thickness
Energy Dissipation Pool	0	EA	None
Boulders	0	EA	Based on bankfull width
Dissipation Pool Streambed Material	0	CY	Based on bankfull width, length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	18	EA	1 every 2 channel meander wave lengths
Foundation Logs	0	EA	0 per structure
Log with Rootwad	53	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	35	CY	2 CY per structure
Racking Material	35	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	74	EA	1 per 50 linear feet of new channel
Log with Rootwad	74	EA	1 per structure
Retaining Log	74	EA	1 per structure
Tight Radius Jam Structure	6	EA	1 every 6 channel meander wave lengths
Foundation Logs	41	EA	3 per structure
Log with Rootwad	35	EA	3 per structure
Small Woody Debris	77	CY	7 CY per structure
Racking Material	83	EA	7 per structure
Bend Jam Structure	12	EA	1 every 3 channel meander wave lengths
Foundation Logs	24	EA	2 per structure
Log with Rootwad	35	EA	3 per structure
Whole Tree	24	EA	1 per structure
Small Woody Debris	153	CY	13 CY per structure
Racking Material	177	EA	15 per structure
Sweeper Log Structure	18	EA	1 every 2 channel meander wave lengths
Whole Tree	18	EA	1 per structure
Small Woody Debris	53	CY	3 CY per structure
Racking Material	53	EA	3 per structure
Channel Spanning Jam	0	EA	None
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Wood Habitat Structure	18	EA	1 every 2 channel meander wave lengths
Log with Rootwad	71	EA	4 per structure
Small Woody Debris	53	CY	3 CY per structure
Racking Material	53	EA	3 per structure
Turning Log Structure	6	EA	1 every 6 channel meander wave lengths
Log with Rootwad	24	EA	4 per structure
Small Woody Debris	18	CY	3 CY per structure
Racking Material	18	EA	3 per structure
Boulders	12	EA	2 per structure
Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	10 per Alcove
Oxbow Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	25 per Alcove
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre, intended for anually wet areas
Zone 2	826	EA	4840 plants per acre
Zone 3	653	EA	3825 plants per acre
Zone 4	1,613	EA	1891 plants per acre
Seeding			
Zone 2	0.17	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.17	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	0.85	AC	5' width each side of channel; 19.02 pure live seed/AC

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MIDAS GOLD

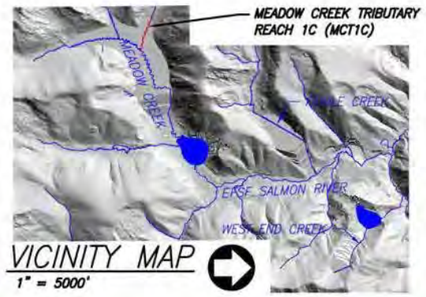
Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Meadow Creek - TSF - Reach MC1C
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: ---

Drawing Name
MC1C Quantities

Drawing No.
MC1C-3



VICINITY MAP
1" = 5000'

NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON TSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE TSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. SEE LEGEND SHEET G6

EXISTING SEEP, TYP
MINE OPERATION TSF DISTURBANCE LIMITS
PROPOSED VALLEY MARGIN WETLANDS – SEE SECTION C–C' DRAWING D–23
FLOW
EXISTING MEADOW CREEK CHANNEL ALIGNMENT
TSF
MEADOW CREEK EXISTING ALIGNMENT
FLOODPLAIN BOUNDARY
PROPOSED VALLEY MARGIN WETLANDS – SEE SECTION C–C' DRAWING D–23
PROPOSED MEADOW CREEK CHANNEL ALIGNMENT – MC1C
PROPOSED MEADOW CREEK CHANNEL ALIGNMENT – MC1E
LINER LIMITS
MINE OPERATION TSF DISTURBANCE LIMITS
TSF
PROPOSED MEADOW CREEK CHANNEL ALIGNMENT – MC1D
FLOW

7075 7100 7125 7150 7175

MEADOW CREEK REACH 1C WETLANDS OVERVIEW PLAN

0 200

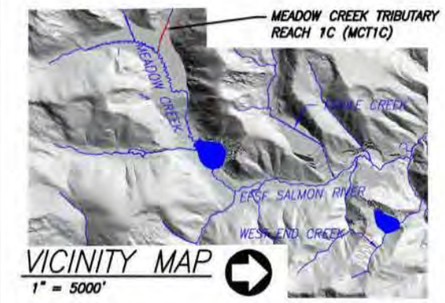
TETRA TECH
MIDAS GOLD

Draft

Date: Feb. 2019
Designed: LC, JHD
Drawn: JHD
Checked: LC
Approved: ---

Drawing Name
MC1C Wetland Sheet

Drawing No.
MC1C–4



NOTES AND ASSUMPTIONS:

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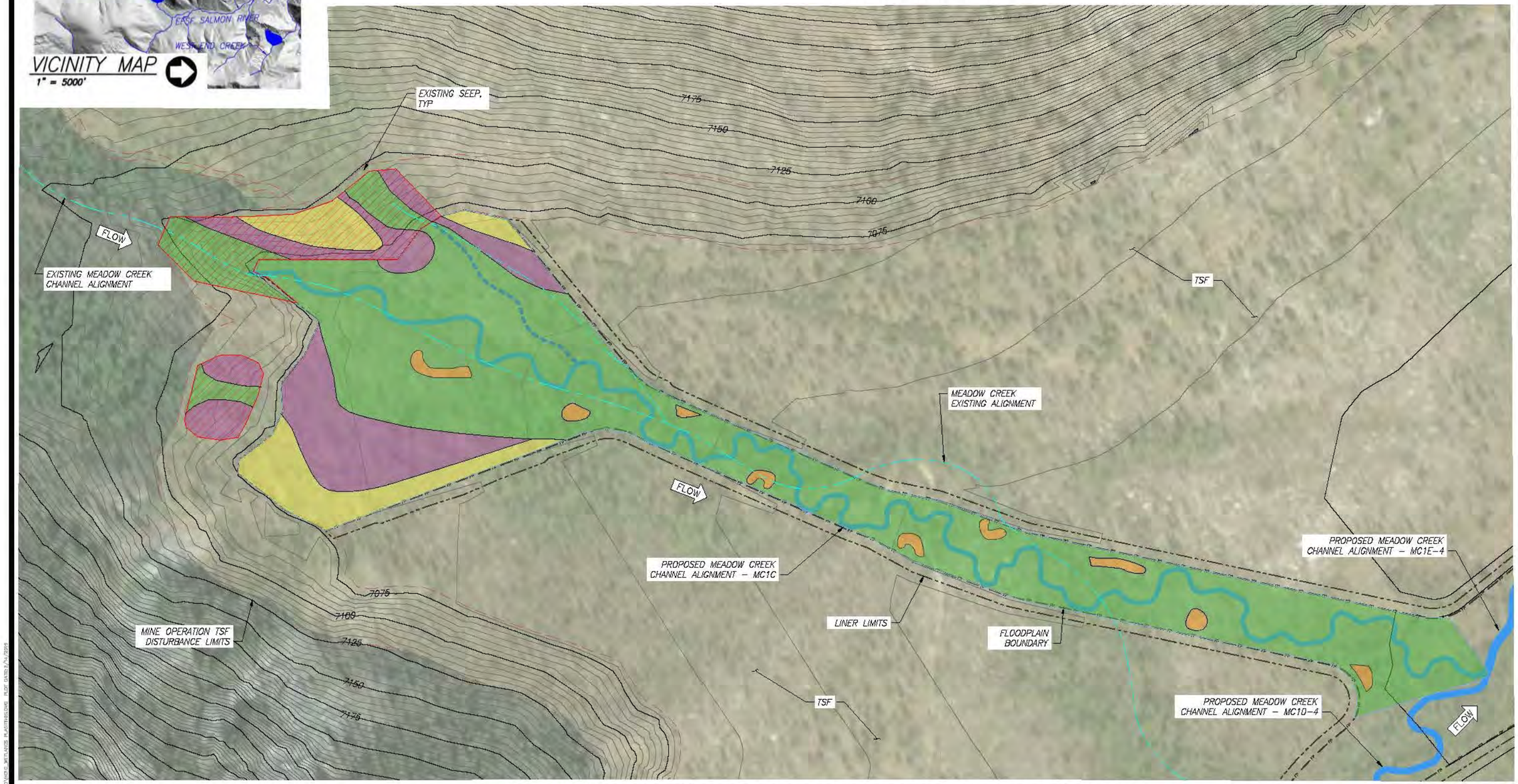
3. SEE LEGEND SHEET G6



MEADOW CREEK REACH 1C WETLANDS PLANTING PLAN

0 200

TETRA TECH

MIDAS GOLD

Draft

Date:	Feb. 2019
Designed:	LC, JHD
Drawn:	JHD
Checked:	LC
Approved:	--

Drawing Name
MC1C Wetland Planting Sheet

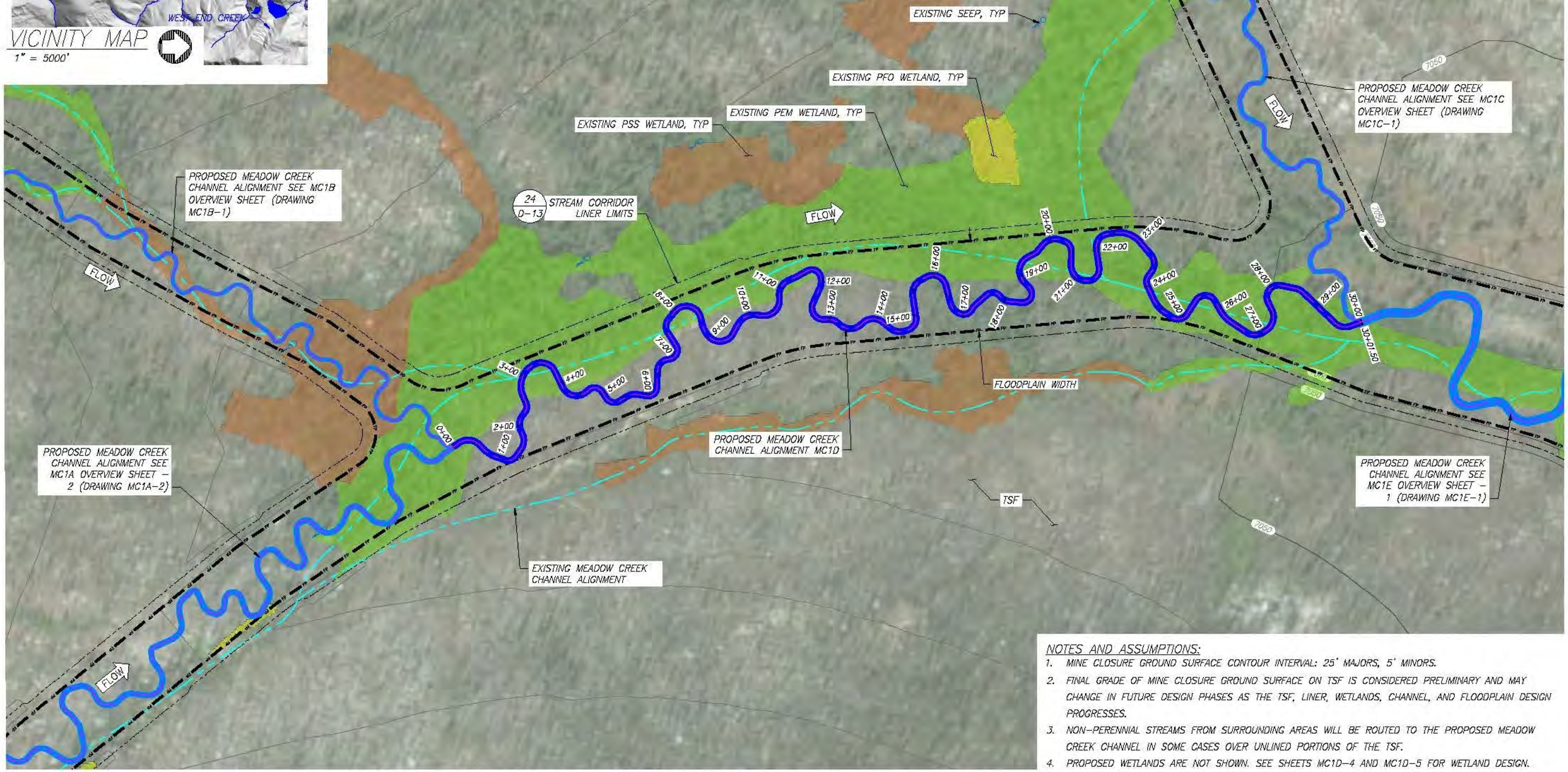
Drawing No.
MC1C-5

MC1D PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
MC1D	**1,790**	**3,002**	**1.7**	**0.30**	**0.18**

MC1D PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
MC1D	**3,002**	**0**

VICINITY MAP

1" = 5000'



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON TSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE TSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. NON-PERENNIAL STREAMS FROM SURROUNDING AREAS WILL BE ROUTED TO THE PROPOSED MEADOW CREEK CHANNEL IN SOME CASES OVER UNLINED PORTIONS OF THE TSF.
4. PROPOSED WETLANDS ARE NOT SHOWN. SEE SHEETS MC1D-4 AND MC1D-5 FOR WETLAND DESIGN.

MEADOW CREEK REACH 1D – RESTORATION REACH SITE OVERVIEW PLAN

0 200 400 Feet

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Boise, Idaho 83705

MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Meadow Creek - TSF - Reach MC1D
Valley County, Idaho

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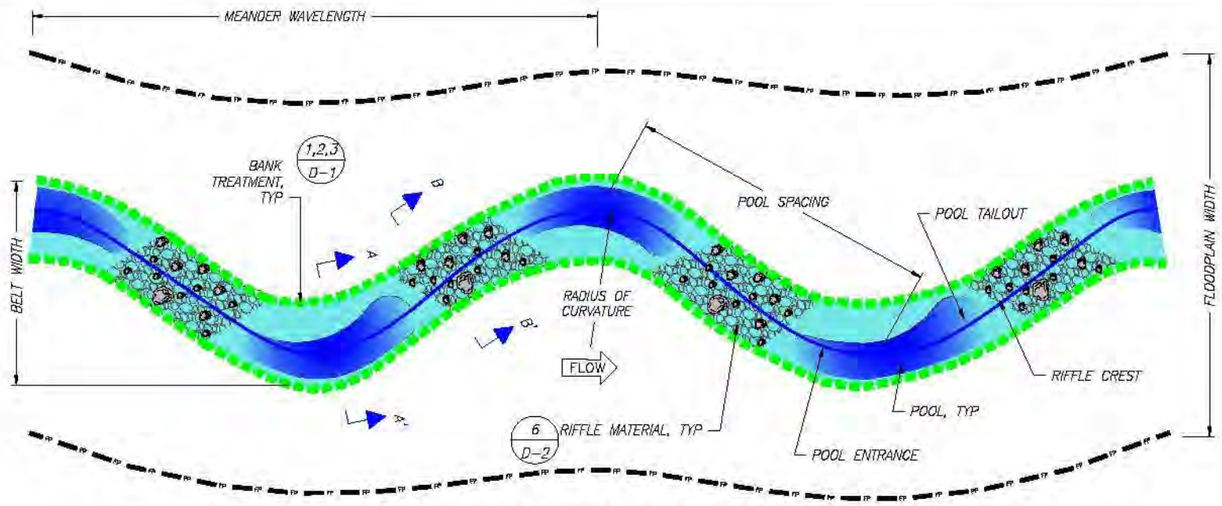
Approved: --

Drawing Name
MC1D Overview Sheet

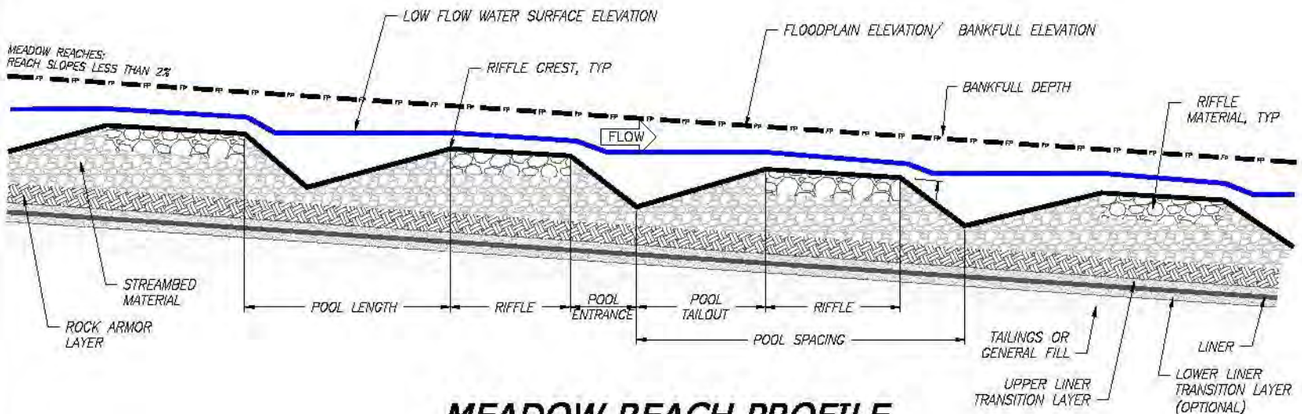
Drawing No.
MC1D-1

LOCATION: R:\PROJECTS\SF_SALMON_11U098\STIBNITE_RESTORATION_MIDAS\CAD\PRODUCTION\MC1D_HANGARFLATS\TSF_CONCEPTDESIGN.DWG PLOT DATE: 2/1/2019



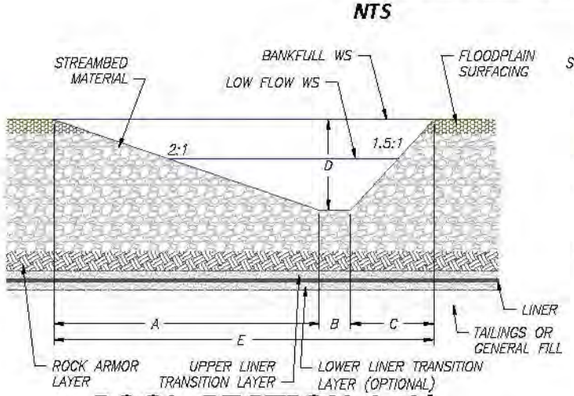
MEADOW REACH PLAN VIEW

NTS



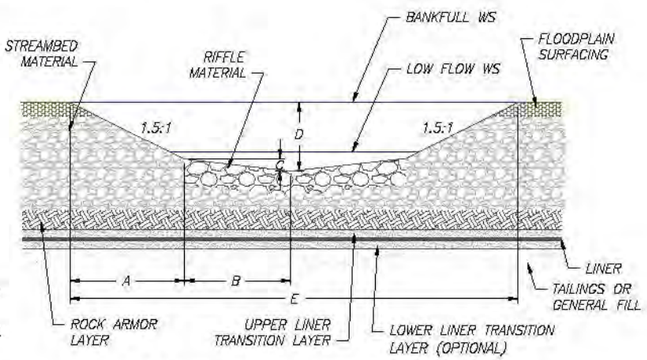
MEADOW REACH PROFILE

NTS



POOL SECTION A-A'

NTS



RIFFLE SECTION B-B'

NTS

NOTES

1. CHANNEL AND FLOODPLAIN SHALL BE CONSTRUCTED TO THE DIMENSIONS IDENTIFIED IN THE CHANNEL DEFINITION TABLES AND AT THE LOCATIONS SHOWN IN INDIVIDUAL REACH OVERVIEW PLAN SHEETS.
2. CHANNEL SIZING FOR TYPICAL POOL AND RIFFLE CROSS SECTIONS IS BASED ON CHANNEL FORMING (BANKFULL) DESIGN FLOW. DETAILED TYPICAL SECTIONS FOR OTHER STREAM HABITATS WILL BE DEVELOPED IN A FUTURE DESIGN PHASE.
3. BANK TREATMENT TYPES ARE NOT DEPICTED IN THE TYPICAL POOL AND RIFFLE SECTIONS. SEE SHEETS D-1 AND D-2 FOR BANK TREATMENT DETAILS.
4. SEE SHEETS D-3 THROUGH D-10 FOR HABITAT STRUCTURE DETAILS.
5. HABITAT STRUCTURE SPACING AND ASSOCIATED QUANTITIES ARE SUMMARIZED IN INDIVIDUAL REACH QUANTITY SHEETS.
6. SEE SHEETS D-1 AND D-20 FOR PLANTING AND SEEDING DETAILS AND PLANTING SCHEDULES.
7. SEE SHEETS D-13 THROUGH D-14 FOR TYPICAL FLOODPLAIN CROSS SECTIONS.

MC1D – MEADOW REACH
PROPOSED CHANNEL DEFINITION TABLES

PLAN TABLE

REACH ID	BANKFULL FLOW (CFS)	BANKFULL WIDTH (FT)	WIDTH/ DEPTH RATIO	AVERAGE DEPTH AT BANKFULL (FT)	MEANDER WAVELENGTH (FT)	MEANDER BELT WIDTH (FT)	RADIUS OF CURVATURE (FT)	AVG POOL SPACING (FT)	FLOODPLAIN WIDTH (FT)
MC1D	44	12	8	1.4	110 - 145	55 - 135	15 - 70	45 - 145	170

PROFILE TABLE

REACH ID	RIFFLE LENGTH (FT)	POOL LENGTH (FT)	POOL ENTRANCE SLOPE (%)	POOL TAILOUT SLOPE (%)
MC1D	20 - 130	10 - 30	38 - 45	19 - 46

MATERIALS TABLE

REACH ID	STREAMBED MATERIAL TYPE	STREAMBED MATERIAL AVG THICKNESS (FT)	RIFFLE MATERIAL TYPE	RIFFLE MATERIAL AVG THICKNESS (FT)	FLOODPLAIN MATERIAL TYPE	FLOODPLAIN MATERIAL AVG THICKNESS (FT)	FLOODPLAIN SURFACING TYPE	FLOODPLAIN SURFACING AVG THICKNESS (FT)
MC1D								

NOTES

1. MATERIALS TABLE TO BE DEVELOPED IN FUTURE DESIGN.
2. STREAMBED MATERIAL TYPES: S1 (D50 = XX"), S2 (D50 = XX"), S3 (D50 = XX").
3. RIFFLE MATERIAL TYPES: S1, S2, S3, R1 (D50 = XX"), R2 (D50 = XX").
4. FLOODPLAIN SURFACING MATERIAL TYPES: GROWTH MEDIA, ALGAE, HYDROMULCH, OR NONE.

SECTIONS TABLE

SECTION	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)
POOL SECTION A - A'	7.0	0.4	5.3	3.5	12.7
RIFFLE SECTION B - B'	2.7	3.1	0.3	2.1	11.5

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MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Meadow Creek - TSF - Reach MC1D
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: ---

Drawing Name
MC1D Typical Plan and Profile

Drawing No.
MC1D-2

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Low complexity for water managment
Stormwater Management			
BMPs and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	High complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	1,866	CY	
Floodplain Excavation (Cut)	0	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	0	CY	
Engineered Streambed Material [3]	6,604	CY	3002 LF of new channel; 4.4 FT average streambed thickness
Sorting and Stockpiling [3]	13,639	CY	Includes Engineered Streambed Material and Rock Armoring/Grade Control
Rock Armoring/ Grade Control [3]	7,034	CY	6" thick layer over the liner area
Ephemeral Swale Channel Material	0	CY	
General Fill	47,753	CY	
Filter Material	0	CY	
Topsoil/ Growth Media [3]	12,790	CY	12" thickness within Liner Area
Liner	379,862	SF	Includes all material and labor
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	3,002	LF	Assumes 50% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	6,004	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	6,004	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	2,001	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	12,008	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	901	LF	Assumes 15% of total length of bank treatment
Brushlayer Live Cuttings	1,801	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	252	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	901	LF	Assumes 15% of total length of bank treatment
Brushlayer Live Cuttings	1,801	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	126	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	47	EA	2 per channel meander wave length
Riffle Material	349	CY	No. of riffles x 20' length x 10' width; 1ft thickness
Energy Dissipation Pool	0	EA	None
Boulders	0	EA	Based on bankfull width
Dissipation Pool Streambed Material	0	CY	Based on bankfull width, length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	12	EA	1 every 2 channel meander wave lengths
Foundation Logs	0	EA	0 per structure
Log with Rootwad	35	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	24	CY	2 CY per structure
Racking Material	24	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	60	EA	1 per 50 linear feet of new channel
Log with Rootwad	60	EA	1 per structure
Retaining Log	60	EA	1 per structure
Tight Radius Jam Structure	4	EA	1 every 6 channel meander wave lengths
Foundation Logs	27	EA	3 per structure
Log with Rootwad	24	EA	3 per structure
Small Woody Debris	51	CY	7 CY per structure
Racking Material	55	EA	7 per structure
Bend Jam Structure	8	EA	1 every 3 channel meander wave lengths
Foundation Logs	16	EA	2 per structure
Log with Rootwad	24	EA	3 per structure
Whole Tree	16	EA	1 per structure
Small Woody Debris	102	CY	13 CY per structure
Racking Material	118	EA	15 per structure
Sweeper Log Structure	12	EA	1 every 2 channel meander wave lengths
Whole Tree	12	EA	1 per structure
Small Woody Debris	35	CY	3 CY per structure
Racking Material	35	EA	3 per structure
Channel Spanning Jam	0	EA	None
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Wood Habitat Structure	12	EA	1 every 2 channel meander wave lengths
Log with Rootwad	47	EA	4 per structure
Small Woody Debris	35	CY	3 CY per structure
Racking Material	35	EA	3 per structure
Turning Log Structure	4	EA	1 every 6 channel meander wave lengths
Log with Rootwad	16	EA	4 per structure
Small Woody Debris	12	CY	3 CY per structure
Racking Material	12	EA	3 per structure
Boulders	8	EA	2 per structure
Backwater Alcove	3	EA	No. varies by reach
Log with Rootwad	30	EA	10 per Alcove
Oxbow Backwater Alcove	1	EA	No. varies by reach
Log with Rootwad	25	EA	25 per Alcove
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre, intended for anually wet areas
Zone 2	667	EA	4840 pants per acre
Zone 3	527	EA	3825 pants per acre
Zone 4	1,303	EA	1891 pants per acre
Seeding			
Zone 2	0.14	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.14	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	0.69	AC	5' width each side of channel; 19.02 pure live seed/AC

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MIDAS GOLD

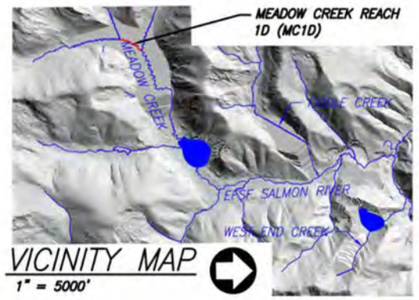
Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Meadow Creek - TSF - Reach MC1D
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: ---

Drawing Name
MC1D Quantities

Drawing No.
MC1D-3



VICINITY MAP
1" = 5000'

NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON TSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE TSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. SEE LEGEND SHEET G6

PROPOSED MEADOW CREEK CHANNEL ALIGNMENT – MC1B
TSF
FLOW
PROPOSED MEADOW CREEK CHANNEL ALIGNMENT – MC1A
LINER LIMITS
FLOODPLAIN BOUNDARY
PROPOSED MEADOW CREEK CHANNEL ALIGNMENT – MC1C
EXISTING MEADOW CREEK CHANNEL ALIGNMENT
FLOW
PROPOSED MEADOW CREEK CHANNEL ALIGNMENT – MC1D
FLOW
FLOW
MINE OPERATION TSF DISTURBANCE LIMITS
7075
7100
7125
7150

MEADOW CREEK REACH 1D WETLANDS OVERVIEW PLAN

0 200

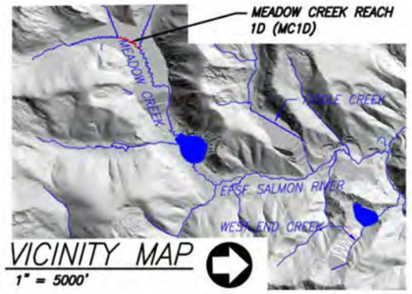
TETRA TECH
MIDAS GOLD

Draft

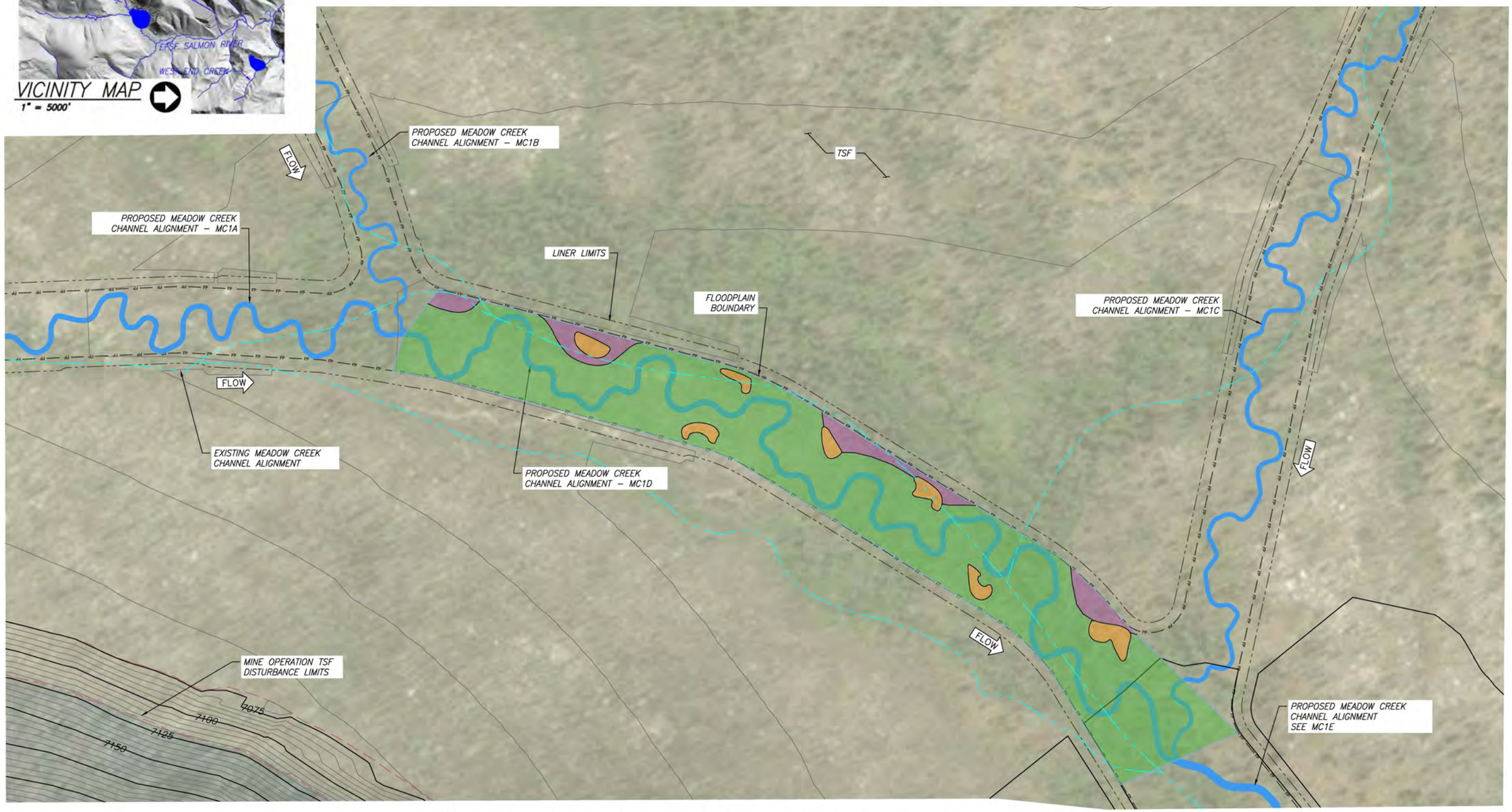
Date:	Feb. 2019
Designed:	LC, JHD
Drawn:	JHD
Checked:	LC
Approved:	--

Drawing Name
MC1D Wetland Sheet

Drawing No.
MC1D-4



VICINITY MAP
1" = 5000'



MEADOW CREEK REACH 1D WETLANDS PLANTING PLAN

0 200

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2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON TSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE TSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. SEE LEGEND SHEET G6

TETRA TECH

MIDAS GOLD

Draft

Date: Feb. 2019
Designed: LC, JHD
Drawn: JHD
Checked: LC
Approved: --

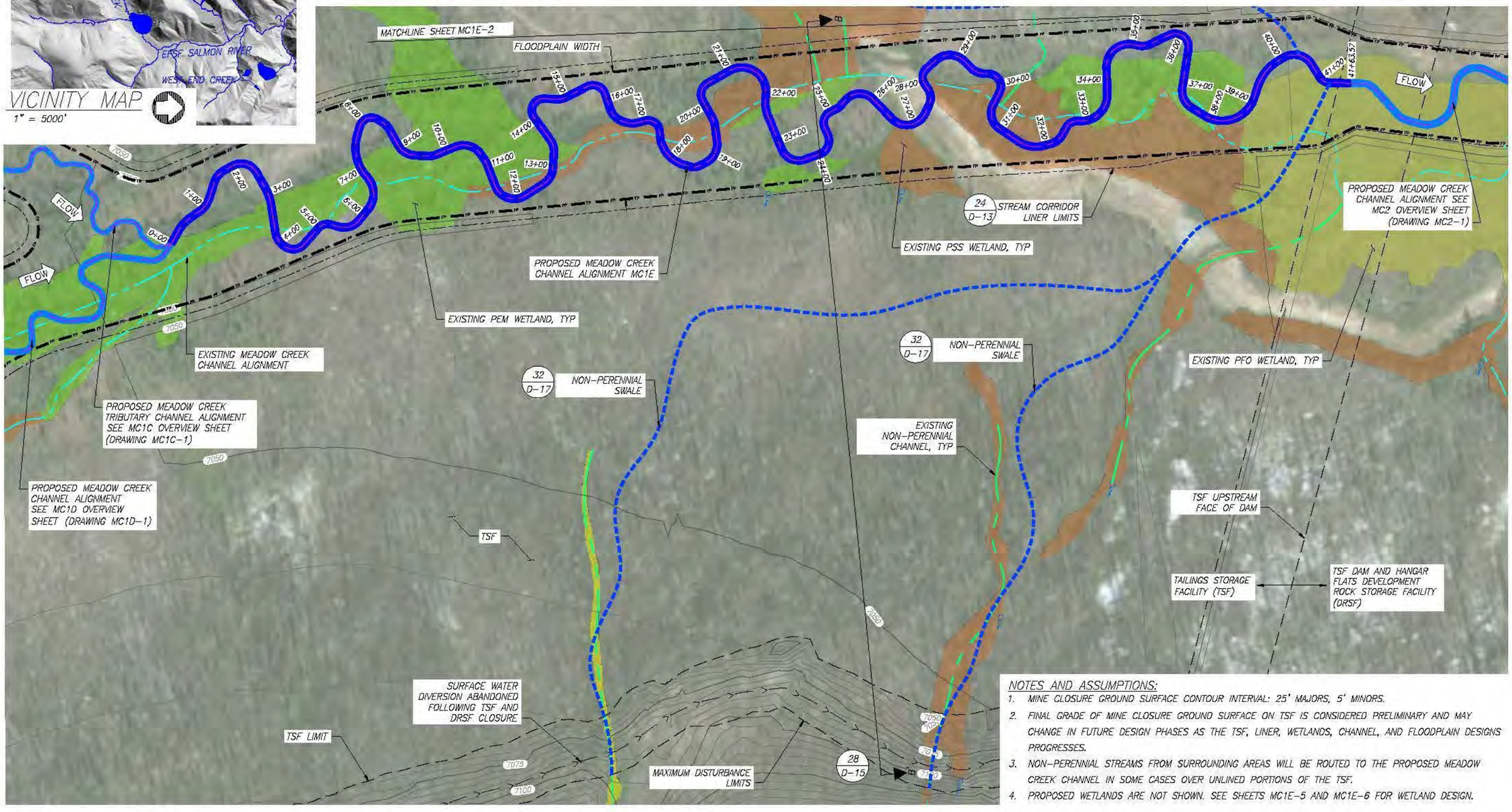
Drawing Name
MC1D Wetland Planting Sheet

Drawing No.
MC1D–5

VICINITY MAP
1" = 5000'

MC1E PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
MC1E	2,314	4,164	1.8	0.20	0.11

MC1E PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
MC1E	4,164	7,172



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3. NON-PERENNIAL STREAMS FROM SURROUNDING AREAS WILL BE ROUTED TO THE PROPOSED MEADOW CREEK CHANNEL IN SOME CASES OVER UNLINED PORTIONS OF THE TSF.
4. PROPOSED WETLANDS ARE NOT SHOWN. SEE SHEETS MC1E-5 AND MC1E-6 FOR WETLAND DESIGN.

MEADOW CREEK REACH 1E - RESTORATION REACH SITE OVERVIEW PLAN

0 200 400 Feet

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MIDAS GOLD

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Stream and Wetland Restoration Concept Design
Meadow Creek - TSF - Reach MC1E
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: --

Drawing Name
MC1E Overview Sheet - 1

Drawing No.
MC1E-1

VICINITY MAP

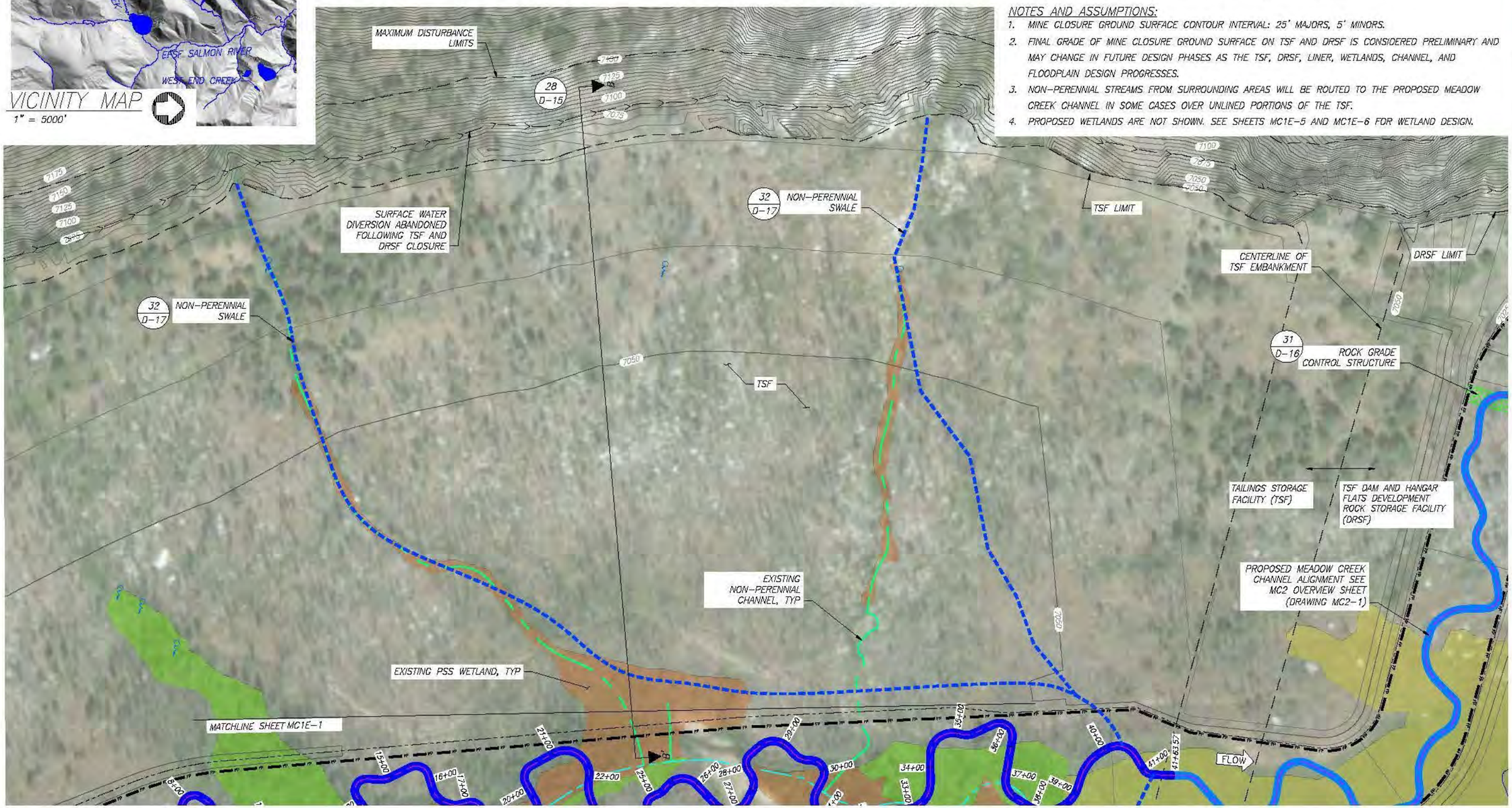
1" = 5000'

MC1E PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
MC1E	**2,314**	**4,164**	**1.8**	**0.20**	**0.11**

MC1A PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
MC1E	**4,164**	**7,172**

NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON TSF AND DRSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE TSF, DRSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. NON-PERENNIAL STREAMS FROM SURROUNDING AREAS WILL BE ROUTED TO THE PROPOSED MEADOW CREEK CHANNEL IN SOME CASES OVER UNLINED PORTIONS OF THE TSF.
4. PROPOSED WETLANDS ARE NOT SHOWN. SEE SHEETS MC1E-5 AND MC1E-6 FOR WETLAND DESIGN.



MEADOW CREEK REACH 1E – RESTORATION REACH SITE OVERVIEW PLAN

0 200 400 Feet

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MIDAS GOLD

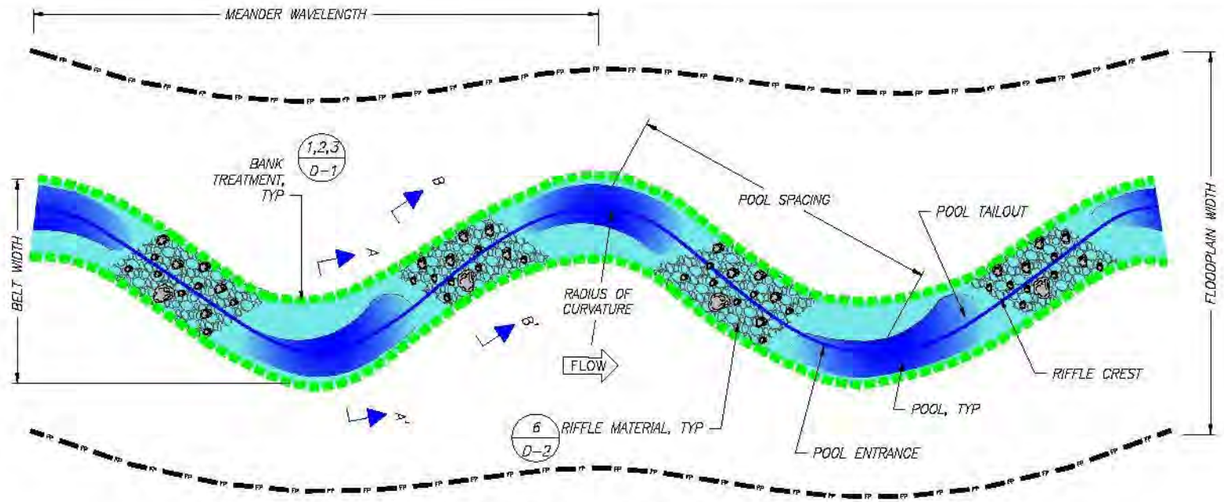
Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Meadow Creek - TSF - Reach MC1E
Valley County, Idaho

Draft

Date:	Feb. 2019
Designed:	JE, JY, MP
Drawn:	JE, JY, MP
Checked:	RR
Approved:	--

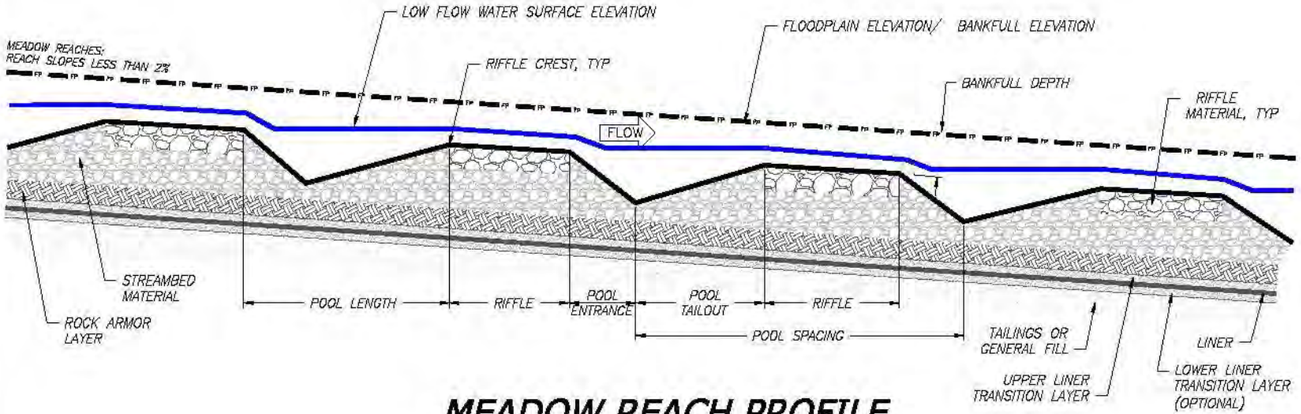
Drawing Name
MC1E Overview Sheet – 2

Drawing No.
MC1E-2



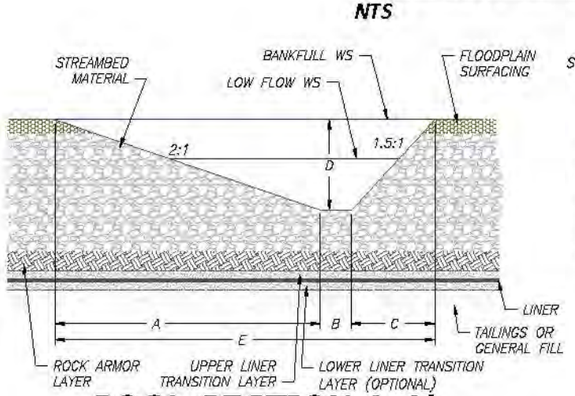
MEADOW REACH PLAN VIEW

NTS



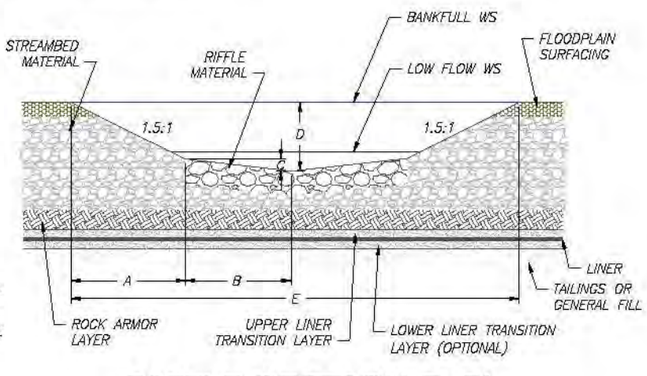
MEADOW REACH PROFILE

NTS



POOL SECTION A-A'

NTS



RIFFLE SECTION B-B'

NTS

NOTES

1. CHANNEL AND FLOODPLAIN SHALL BE CONSTRUCTED TO THE DIMENSIONS IDENTIFIED IN THE CHANNEL DEFINITION TABLES AND AT THE LOCATIONS SHOWN IN INDIVIDUAL REACH OVERVIEW PLAN SHEETS.
2. CHANNEL SIZING FOR TYPICAL POOL AND RIFFLE CROSS SECTIONS IS BASED ON CHANNEL FORMING (BANKFULL) DESIGN FLOW. DETAILED TYPICAL SECTIONS FOR OTHER STREAM HABITATS WILL BE DEVELOPED IN A FUTURE DESIGN PHASE.
3. BANK TREATMENT TYPES ARE NOT DEPICTED IN THE TYPICAL POOL AND RIFFLE SECTIONS. SEE SHEETS D-1 AND D-2 FOR BANK TREATMENT DETAILS.
4. SEE SHEETS D-3 THROUGH D-10 FOR HABITAT STRUCTURE DETAILS.
5. HABITAT STRUCTURE SPACING AND ASSOCIATED QUANTITIES ARE SUMMARIZED IN INDIVIDUAL REACH QUANTITY SHEETS.
6. SEE SHEETS D-1 AND D-20 FOR PLANTING AND SEEDING DETAILS AND PLANTING SCHEDULES.
7. SEE SHEETS D-13 THROUGH D-14 FOR TYPICAL FLOODPLAIN CROSS SECTIONS.

MC1E – MEADOW REACH
PROPOSED CHANNEL DEFINITION TABLES

PLAN TABLE

REACH ID	BANKFULL FLOW (CFS)	BANKFULL WIDTH (FT)	WIDTH/ DEPTH RATIO	AVERAGE DEPTH AT BANKFULL (FT)	MEANDER WAVELENGTH (FT)	MEANDER BELT WIDTH (FT)	RADIUS OF CURVATURE (FT)	AVG POOL SPACING (FT)	FLOODPLAIN WIDTH (FT)
MC1E	**67**	**15**	**9**	**1.8**	**150 - 190**	**80 - 195**	**25 - 90**	**60 - 190**	**250**

PROFILE TABLE

REACH ID	RIFFLE LENGTH (FT)	POOL LENGTH (FT)	POOL ENTRANCE SLOPE (%)	POOL TAILOUT SLOPE (%)
MC1E	**25 - 175**	**15 - 35**	**37 - 45**	**18 - 44**

MATERIALS TABLE

REACH ID	STREAMBED MATERIAL TYPE	STREAMBED MATERIAL AVG THICKNESS (FT)	RIFFLE MATERIAL TYPE	RIFFLE MATERIAL AVG THICKNESS (FT)	FLOODPLAIN MATERIAL TYPE	FLOODPLAIN MATERIAL AVG THICKNESS (FT)	FLOODPLAIN SURFACING TYPE	FLOODPLAIN SURFACING AVG THICKNESS (FT)
MC1E								

NOTES

1. MATERIALS TABLE TO BE DEVELOPED IN FUTURE DESIGN.
2. STREAMBED MATERIAL TYPES: S1 (D50 = XX"), S2 (D50 = XX"), S3 (D50 = XX").
3. RIFFLE MATERIAL TYPES: S1, S2, S3, R1 (D50 = XX"), R2 (D50 = XX").
4. FLOODPLAIN SURFACING MATERIAL TYPES: GROWTH MEDIA, ALGAE, HYDROMULCH, OR NONE.

SECTIONS TABLE

SECTION	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)
POOL SECTION A - A'	**9.0**	**1.2**	**6.8**	**4.5**	**16.9**
RIFFLE SECTION B - B'	**3.3**	**2.2**	**0.2**	**2.4**	**15.4**

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MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Meadow Creek - TSF - Reach MC1E
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: ---

Drawing Name
MC1E Typical Plan and Profile

Drawing No.
MC1E-3

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Low complexity for water managment
Stormwater Management			
BMPs and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	High complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	5,048	CY	
Floodplain Excavation (Cut)	0	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	0	CY	
Engineered Streambed Material [3]	15,564	CY	4164 LF of new channel; 5.8 FT average streambed thickness
Sorting and Stockpiling [3]	28,926	CY	Includes Engineered Streambed Material and Rock Armoring/Grade Control
Rock Armoring/ Grade Control [3]	13,362	CY	6" thick layer over the liner area
Ephemeral Swale Channel Material [3]	664	CY	7172 LF of new channel;0.5 FT gravel thickness; 2' SF XS
General Fill	124,838	CY	
Filter Material	0	CY	
Topsoil/ Growth Media [3]	23,021	CY	12" thickness within Liner Area
Liner	721,552	SF	Includes all material and labor
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	4,164	LF	Assumes 50% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	8,328	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	8,328	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	2,776	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	16,656	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	1,249	LF	Assumes 15% of total length of bank treatment
Brushlayer Live Cuttings	2,498	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	350	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	1,249	LF	Assumes 15% of total length of bank treatment
Brushlayer Live Cuttings	2,498	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	175	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	49	EA	2 per channel meander wave length
Riffle Material	363	CY	No. of riffles x 20' length x 10' width; 1ft thickness
Energy Dissipation Pool	0	EA	None
Boulders	0	EA	Based on bankfull width
Dissipation Pool Streambed Material	0	CY	Based on bankfull width, length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	12	EA	1 every 2 channel meander wave lengths
Foundation Logs	0	EA	0 per structure
Log with Rootwad	37	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	24	CY	2 CY per structure
Racking Material	24	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	83	EA	1 per 50 linear feet of new channel
Log with Rootwad	83	EA	1 per structure
Retaining Log	83	EA	1 per structure
Tight Radius Jam Structure	4	EA	1 every 6 channel meander wave lengths
Foundation Logs	29	EA	3 per structure
Log with Rootwad	24	EA	3 per structure
Small Woody Debris	53	CY	7 CY per structure
Racking Material	57	EA	7 per structure
Bend Jam Structure	8	EA	1 every 3 channel meander wave lengths
Foundation Logs	16	EA	2 per structure
Log with Rootwad	24	EA	3 per structure
Whole Tree	16	EA	1 per structure
Small Woody Debris	106	CY	13 CY per structure
Racking Material	122	EA	15 per structure
Sweeper Log Structure	12	EA	1 every 2 channel meander wave lengths
Whole Tree	12	EA	1 per structure
Small Woody Debris	37	CY	3 CY per structure
Racking Material	37	EA	3 per structure
Channel Spanning Jam	0	EA	None
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Wood Habitat Structure	12	EA	1 every 2 channel meander wave lengths
Log with Rootwad	49	EA	4 per structure
Small Woody Debris	37	CY	3 CY per structure
Racking Material	37	EA	3 per structure
Turning Log Structure	4	EA	1 every 6 channel meander wave lengths
Log with Rootwad	16	EA	4 per structure
Small Woody Debris	12	CY	3 CY per structure
Racking Material	12	EA	3 per structure
Boulders	8	EA	2 per structure
Backwater Alcove	4	EA	No. varies by reach
Log with Rootwad	40	EA	10 per Alcove
Oxbow Backwater Alcove	2	EA	No. varies by reach
Log with Rootwad	50	EA	25 per Alcove
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre, intended for anually wet areas
Zone 2	925	EA	4840 plants per acre
Zone 3	731	EA	3825 plants per acre
Zone 4	1,808	EA	1891 plants per acre
Seeding			
Zone 2	0.19	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.19	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	0.96	AC	5' width each side of channel; 19.02 pure live seed/AC

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MIDAS GOLD

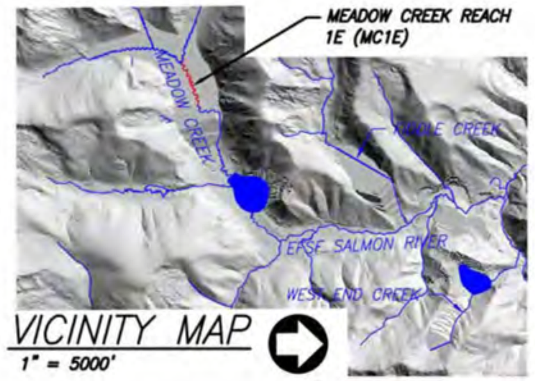
Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Meadow Creek - TSF - Reach MC1E
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: ---

Drawing Name
MC1E Quantities

Drawing No.
MC1E-4



VICINITY MAP
1" = 5000'

NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON TSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE TSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. SEE LEGEND SHEET G6

MEADOW CREEK REACH 1E WETLANDS OVERVIEW PLAN

0 200

TETRA TECH

MIDAS GOLD

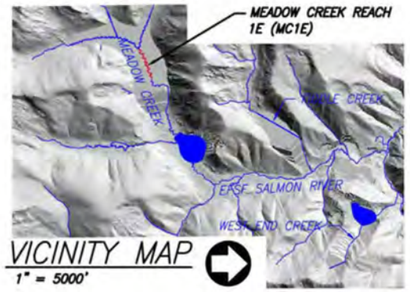
Draft

Date: Feb. 2019
Designed: LC, JHD
Drawn: JHD
Checked: LC
Approved: ––

Drawing Name
MC1E Wetland Sheet

Drawing No.
MC1E–5

LOCATION: C:\USERS\JIM.DUSHIN\PICTURES\LARRY\CAD\MC1E_WETLANDS OVERVIEW.DWG PLOT DATE: 2/14/2019



VICINITY MAP
1" = 5000'

NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON TSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE TSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. SEE LEGEND SHEET G6

PROPOSED MEADOW CREEK CHANNEL ALIGNMENT – MC1C
FLOW
FLOW
FLOODPLAIN BOUNDARY
LINER LIMITS
TSF
7050
EXISTING MEADOW CREEK CHANNEL ALIGNMENT
PROPOSED MEADOW CREEK CHANNEL ALIGNMENT – MC1D
FLOW
7050
PROPOSED MEADOW CREEK CHANNEL ALIGNMENT – MC1E
PROPOSED MEADOW CREEK CHANNEL ALIGNMENT – MC2
TSF
FLOW

MEADOW CREEK REACH 1E WETLANDS PLANTING PLAN

0 200

TETRA TECH

MIDAS GOLD

Draft

Date:	Feb. 2019
Designed:	LC, JHD
Drawn:	JHD
Checked:	LC
Approved:	--

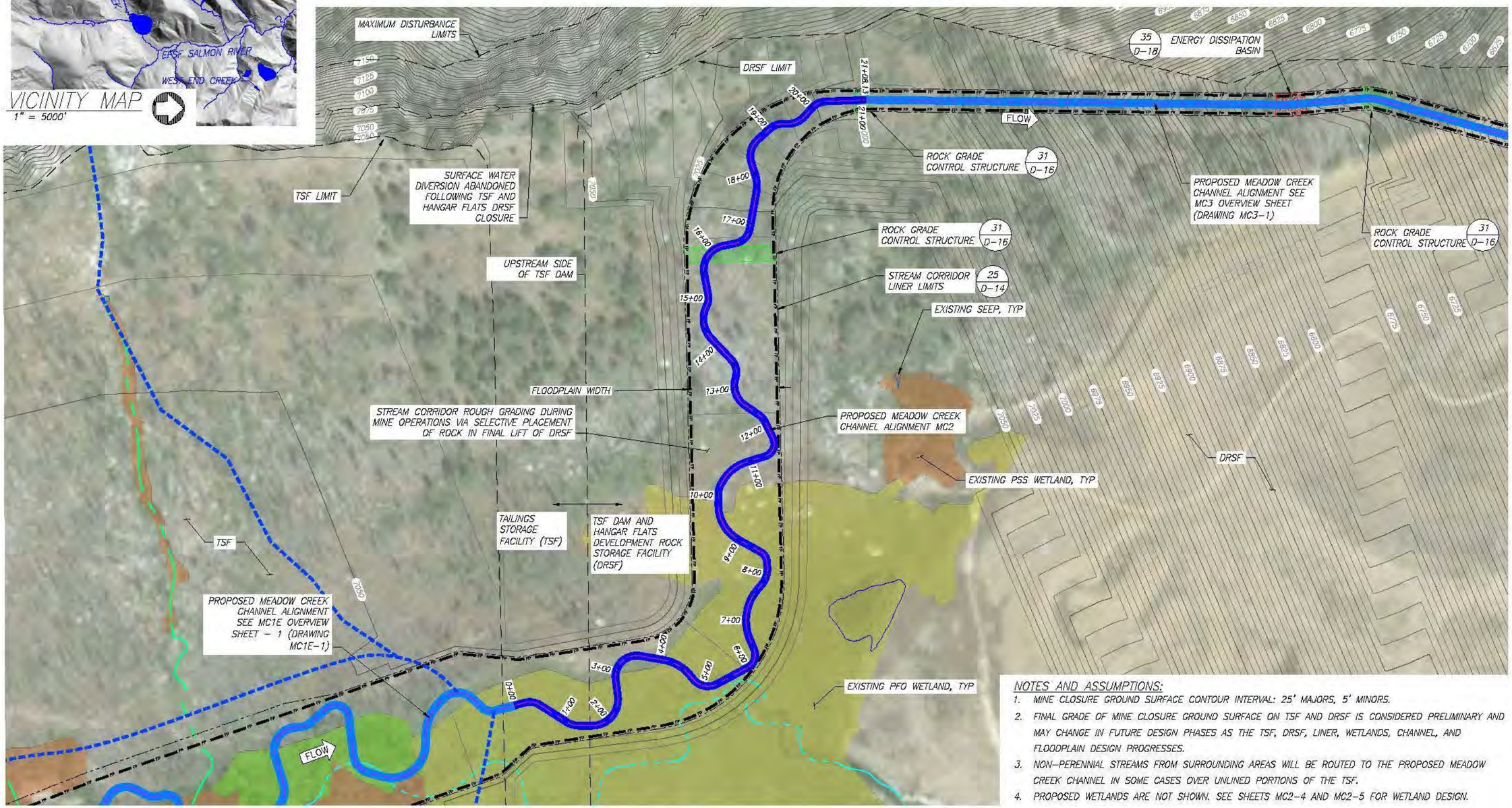
Drawing Name
MC1E Wetland Planting Sheet

Drawing No.
MC1E-6

VICINITY MAP
1" = 5000'

MC2 PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
MC2	1,656	2,108	1.3	0.80	0.63

MC2 PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
MC2	2,108	0



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON TSF AND DRSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE TSF, DRSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. NON-PERENNIAL STREAMS FROM SURROUNDING AREAS WILL BE ROUTED TO THE PROPOSED MEADOW CREEK CHANNEL IN SOME CASES OVER UNLINED PORTIONS OF THE TSF.
4. PROPOSED WETLANDS ARE NOT SHOWN. SEE SHEETS MC2-4 AND MC2-5 FOR WETLAND DESIGN.

MEADOW CREEK REACH 2 - RESTORATION REACH SITE OVERVIEW PLAN

0 200 400 Feet

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MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Meadow Creek - Hanger Flats DRSF - Reach MC2
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
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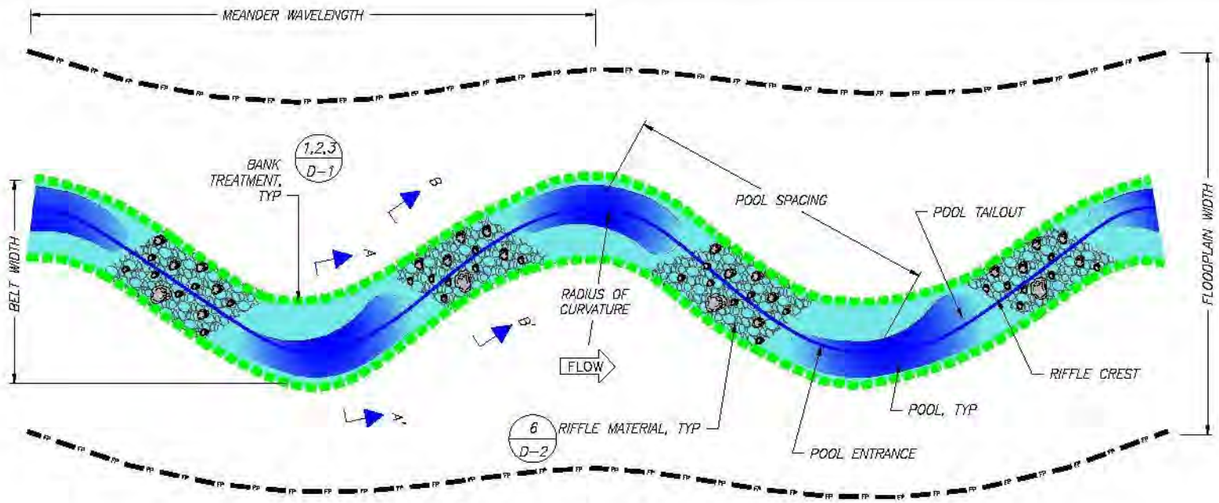
Approved: --

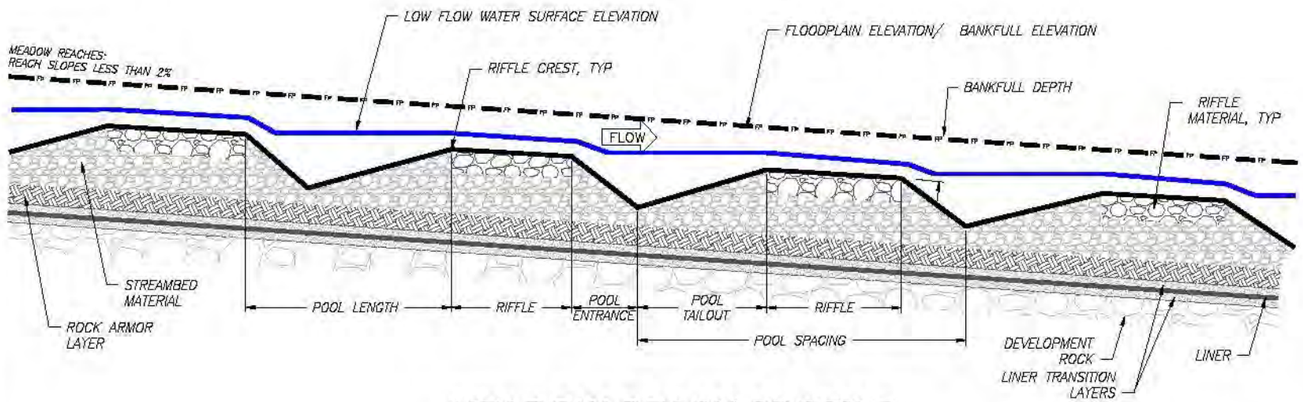
Drawing Name
MC2 Overview Sheet

Drawing No.
MC2-1



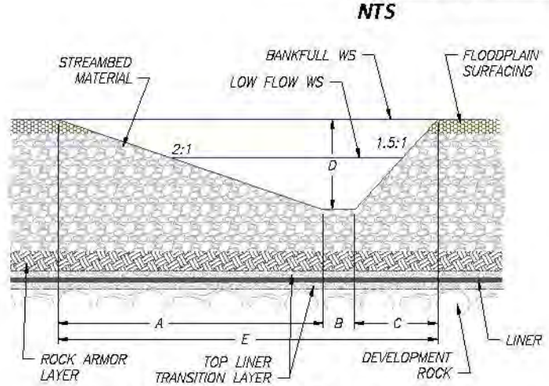
MEADOW REACH PLAN VIEW

NTS



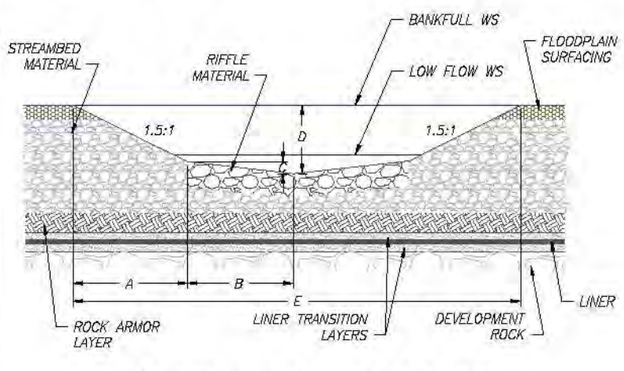
MEADOW REACH PROFILE

NTS



POOL SECTION A-A'

NTS



RIFFLE SECTION B-B'

NTS

NOTES

1. CHANNEL AND FLOODPLAIN SHALL BE CONSTRUCTED TO THE DIMENSIONS IDENTIFIED IN THE CHANNEL DEFINITION TABLES AND AT THE LOCATIONS SHOWN IN INDIVIDUAL REACH OVERVIEW PLAN SHEETS.
2. CHANNEL SIZING FOR TYPICAL POOL AND RIFFLE CROSS SECTIONS IS BASED ON CHANNEL FORMING (BANKFULL) DESIGN FLOW. DETAILED TYPICAL SECTIONS FOR OTHER STREAM HABITATS WILL BE DEVELOPED IN A FUTURE DESIGN PHASE.
3. BANK TREATMENT TYPES ARE NOT DEPICTED IN THE TYPICAL POOL AND RIFFLE SECTIONS. SEE SHEETS D-1 AND D-2 FOR BANK TREATMENT DETAILS.
4. SEE SHEETS D-3 THROUGH D-10 FOR HABITAT STRUCTURE DETAILS.
5. HABITAT STRUCTURE SPACING AND ASSOCIATED QUANTITIES ARE SUMMARIZED IN INDIVIDUAL REACH QUANTITY SHEETS.
6. SEE SHEETS D-1 AND D-20 FOR PLANTING AND SEEDING DETAILS AND PLANTING SCHEDULES.
7. SEE SHEETS D-13 THROUGH D-14 FOR TYPICAL FLOODPLAIN CROSS SECTIONS.

MC2 – MEADOW REACH
PROPOSED CHANNEL DEFINITION TABLES

PLANT TABLE

REACH ID	BANKFULL FLOW (CFS)	BANKFULL WIDTH (FT)	WIDTH/ DEPTH RATIO	AVERAGE DEPTH AT BANKFULL (FT)	MEANDER WAVELENGTH (FT)	MEANDER BELT WIDTH (FT)	RADIUS OF CURVATURE (FT)	AVG POOL SPACING (FT)	FLOODPLAIN WIDTH (FT)
MC2	84	14	10	1.4	135 - 175	70 - 135	20 - 85	55 - 175	170

PROFILE TABLE

REACH ID	RIFFLE LENGTH (FT)	POOL LENGTH (FT)	POOL ENTRANCE SLOPE (%)	POOL TAILOUT SLOPE (%)
MC2	25 - 160	15 - 35	31 - 45	16 - 37

MATERIALS TABLE

REACH ID	STREAMBED MATERIAL TYPE	STREAMBED MATERIAL AVG THICKNESS (FT)	RIFFLE MATERIAL TYPE	RIFFLE MATERIAL AVG THICKNESS (FT)	FLOODPLAIN MATERIAL TYPE	FLOODPLAIN MATERIAL AVG THICKNESS (FT)	FLOODPLAIN SURFACING TYPE	FLOODPLAIN SURFACING AVG THICKNESS (FT)
MC2								

NOTES

1. MATERIALS TABLE TO BE DEVELOPED IN FUTURE DESIGN.
2. STREAMBED MATERIAL TYPES: S1 (D50 = XX"), S2 (D50 = XX"), S3 (D50 = XX").
3. RIFFLE MATERIAL TYPES: S1, S2, S3, R1 (D50 = XX"), R2 (D50 = XX").
4. FLOODPLAIN SURFACING MATERIAL TYPES: GROWTH MEDIA, ALGAE, HYDROMULCH, OR NONE.

SECTIONS TABLE

SECTION	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)
POOL SECTION A - A'	7.0	3.3	5.3	3.5	15.5
RIFFLE SECTION B - B'	2.3	4.7	0.5	2.0	14.1

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MIDAS GOLD

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Stream and Wetland Restoration Concept Design
Meadow Creek - Hanger Flats DRSF - Reach MC2
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: ---

Drawing Name
MC2 Typical Plan and Profile

Drawing No.
MC2-2

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Low complexity for water managment
Stormwater Management			
BMPs and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	High complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	0	CY	
Floodplain Excavation (Cut)	0	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	0	CY	
Engineered Streambed Material [3]	5,531	CY	2108 LF of new channel; 4.4 FT average streambed thickness
Sorting and Stockpiling [3]	11,093	CY	Includes Engineered Streambed Material and Rock Armoring/Grade Control
Rock Armoring/ Grade Control [3]	5,563	CY	(1) grade control structure; floodplain width x 30' x max scour depth
Ephemeral Swale Channel Material	0	CY	
General Fill	29,135	CY	
Filter Material	18,003	CY	
Topsoil/ Growth Media [3]	7,901	CY	12" thickness within Liner Area
Liner	243,045	SF	Includes all material and labor
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	2,108	LF	Assumes 50% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	4,216	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	4,216	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	1,405	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	8,432	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	632	LF	Assumes 15% of total length of bank treatment
Brushlayer Live Cuttings	1,265	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	177	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	632	LF	Assumes 15% of total length of bank treatment
Brushlayer Live Cuttings	1,265	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	89	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	27	EA	2 per channel meander wave length
Riffle Material	203	CY	No. of riffles x 20' length x 10' width; 1ft thickness
Energy Dissipation Pool	0	EA	None
Boulders	0	EA	Based on bankfull width
Dissipation Pool Streambed Material	0	CY	Based on bankfull width, length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	7	EA	1 every 2 channel meander wave lengths
Foundation Logs	0	EA	0 per structure
Log with Rootwad	21	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	14	CY	2 CY per structure
Racking Material	14	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	42	EA	1 per 50 linear feet of new channel
Log with Rootwad	42	EA	1 per structure
Retaining Log	42	EA	1 per structure
Tight Radius Jam Structure	2	EA	1 every 6 channel meander wave lengths
Foundation Logs	16	EA	3 per structure
Log with Rootwad	14	EA	3 per structure
Small Woody Debris	30	CY	7 CY per structure
Racking Material	32	EA	7 per structure
Bend Jam Structure	5	EA	1 every 3 channel meander wave lengths
Foundation Logs	9	EA	2 per structure
Log with Rootwad	14	EA	3 per structure
Whole Tree	9	EA	1 per structure
Small Woody Debris	60	CY	13 CY per structure
Racking Material	69	EA	15 per structure
Sweeper Log Structure	7	EA	1 every 2 channel meander wave lengths
Whole Tree	7	EA	1 per structure
Small Woody Debris	21	CY	3 CY per structure
Racking Material	21	EA	3 per structure
Channel Spanning Jam	0	EA	None
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Wood Habitat Structure	7	EA	1 every 2 channel meander wave lengths
Log with Rootwad	27	EA	4 per structure
Small Woody Debris	21	CY	3 CY per structure
Racking Material	21	EA	3 per structure
Turning Log Structure	2	EA	1 every 6 channel meander wave lengths
Log with Rootwad	9	EA	4 per structure
Small Woody Debris	7	CY	3 CY per structure
Racking Material	7	EA	3 per structure
Boulders	5	EA	2 per structure
Backwater Alcove	4	EA	No. varies by reach
Log with Rootwad	40	EA	10 per Alcove
Oxbow Backwater Alcove	2	EA	No. varies by reach
Log with Rootwad	50	EA	25 per Alcove
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre, intended for anually wet areas
Zone 2	468	EA	4840 plants per acre
Zone 3	370	EA	3825 plants per acre
Zone 4	915	EA	1891 plants per acre
Seeding			
Zone 2	0.10	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.10	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	0.48	AC	5' width each side of channel; 19.02 pure live seed/AC

Applied Science & Engineering
2449 S. Vista Ave. Suite B
Boise, Idaho 83705

MIDAS GOLD

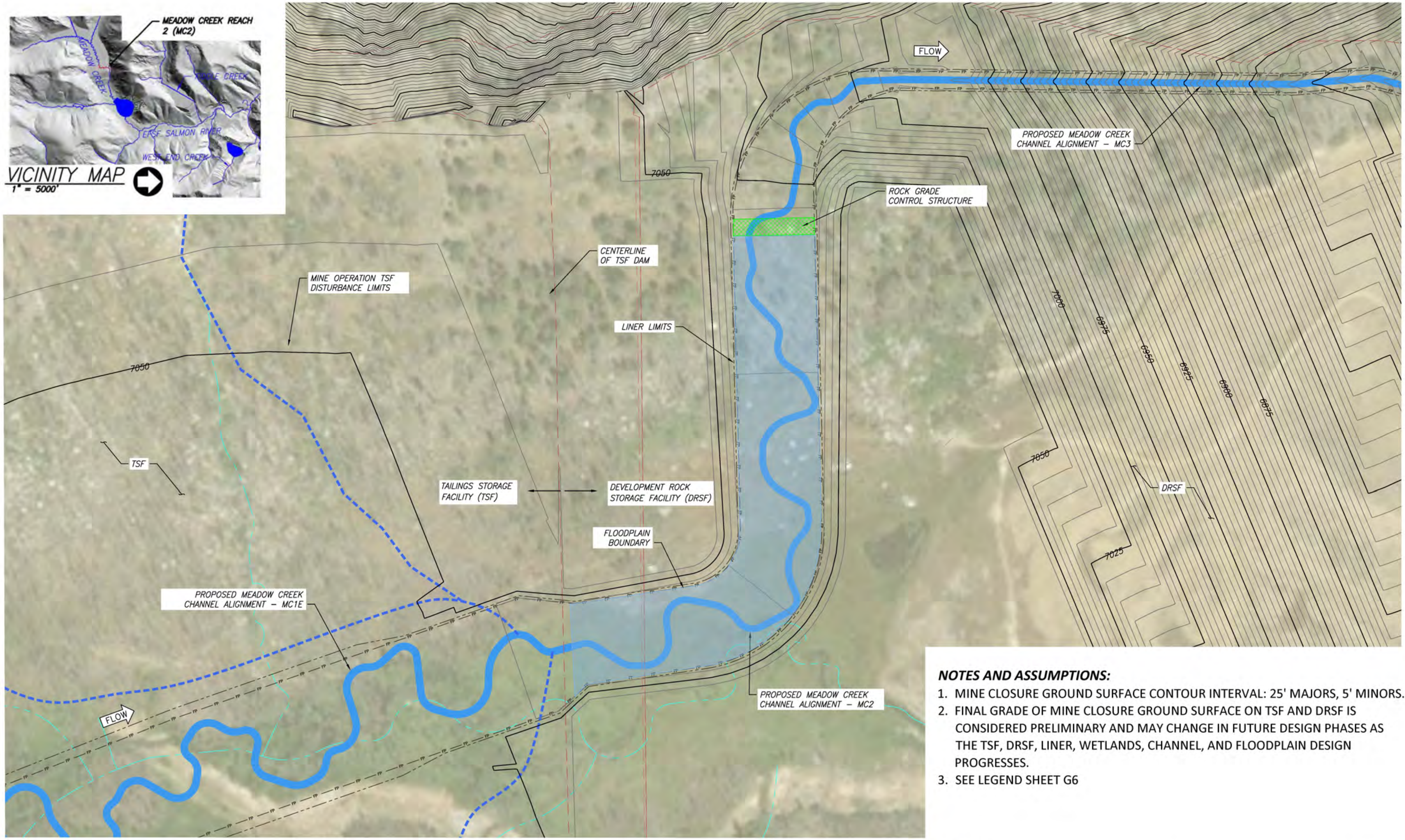
Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Meadow Creek - Hanger Flats DRSF - Reach MC2
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: ---

Drawing Name
MC2 Quantities

Drawing No.
MC2-3



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON TSF AND DRSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE TSF, DRSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. SEE LEGEND SHEET G6

MEADOW CREEK REACH 2 WETLANDS OVERVIEW PLAN

0 200

TETRA TECH

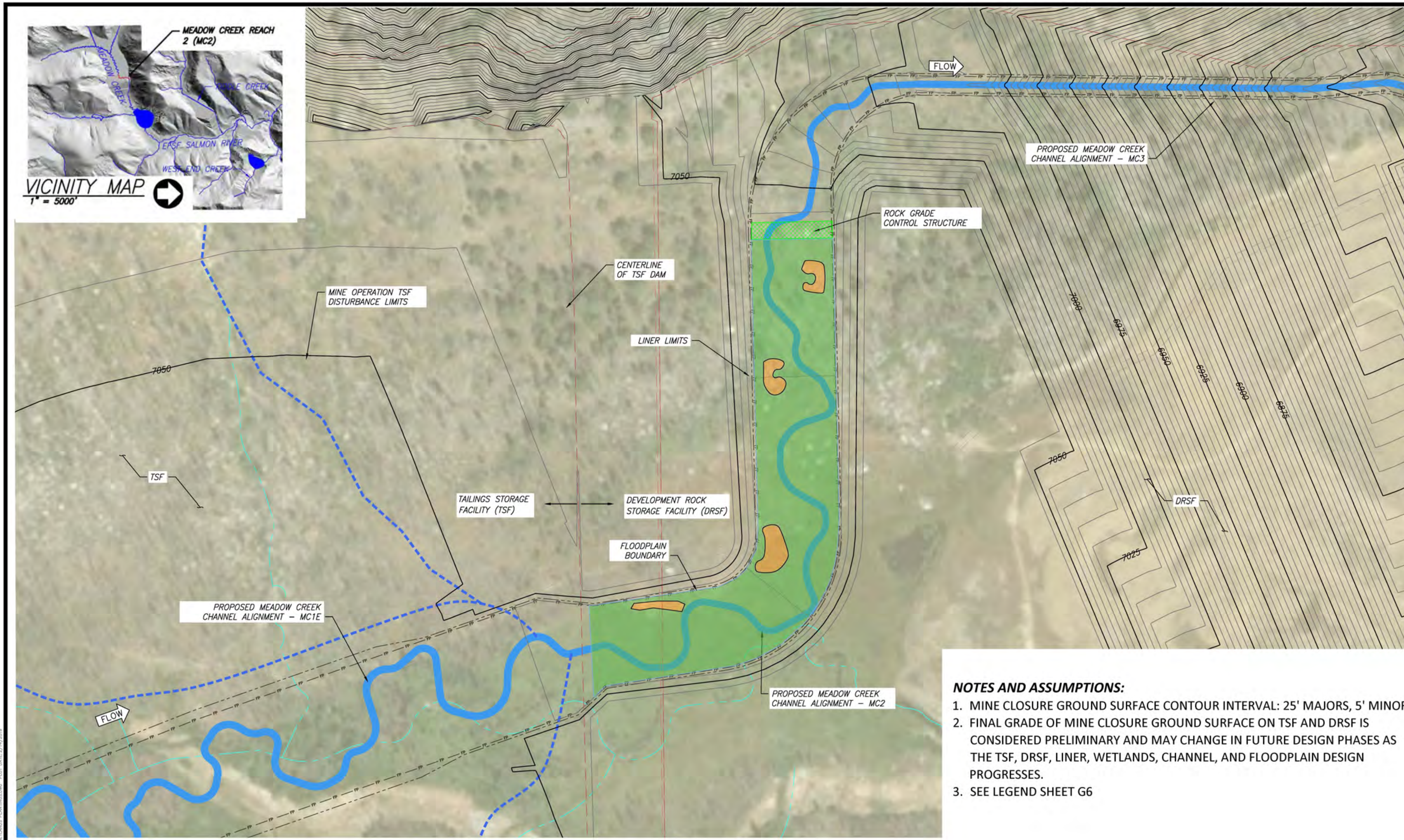
MIDAS GOLD

Draft

Date: Feb. 2019
Designed: LC, JHD
Drawn: JHD
Checked: LC
Approved: ––

Drawing Name
MC2 Wetland Sheet

Drawing No.
MC2–4



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON TSF AND DRSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE TSF, DRSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. SEE LEGEND SHEET G6

MEADOW CREEK REACH 2 WETLANDS PLANTING PLAN

0 200

TETRA TECH

MIDAS GOLD

Draft

Date: Feb. 2019
Designed: LC, JHD
Drawn: JHD
Checked: LC
Approved: ––

Drawing Name
MC2 Wetland Planting Sheet

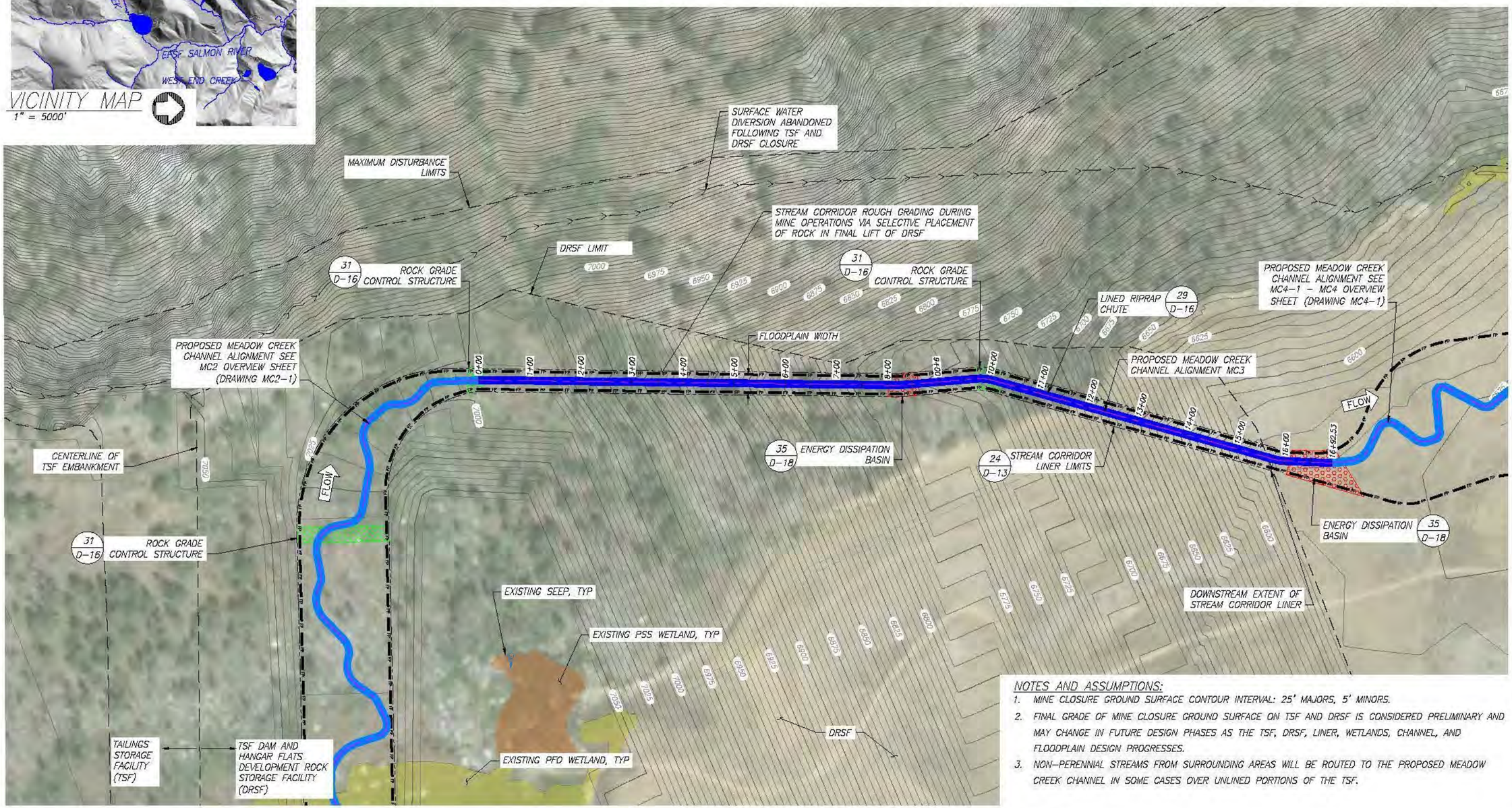
Drawing No.
MC2–5

LOCATION: C:\USERS\JIM.DUSHIN\PICTURES\LARRY\CAD\MC2_WETLANDS PLANTINGS.DWG PLOT DATE: 2/14/2019

VICINITY MAP
1" = 5000'

MC3 PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
MC3	**1,693**	**1,693**	**1.0**	**23.98**	**23.99**

MC3 PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
MC3	**1,693**	**0**



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON TSF AND DRSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE TSF, DRSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. NON-PERENNIAL STREAMS FROM SURROUNDING AREAS WILL BE ROUTED TO THE PROPOSED MEADOW CREEK CHANNEL IN SOME CASES OVER UNLINED PORTIONS OF THE TSF.

MEADOW CREEK REACH 3 – RESTORATION REACH SITE OVERVIEW PLAN

0 200 400 Feet

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Boise, Idaho 83705

MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Meadow Creek - Hanger Flats DRSF - Reach MC3
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: --

Drawing Name
MC3 Overview Sheet

Drawing No.
MC3-1

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Low complexity for water managment
Stormwater Management			
BMPs and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	High complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	0	CY	
Floodplain Excavation (Cut)	0	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	0	CY	
Engineered Streambed Material [3]	4,343	CY	XS area of riprap chute times chute length; 225 sq. ft. x 1693 ft.
Sorting and Stockpiling [3]	20,026	CY	Includes Engineered Streambed Material and Rock Armoring/Grade Control
Rock Armoring/ Grade Control [3]	15,684	CY	(2) grade control structures; floodplain width x 30' x max scour depth
Ephemeral Swale Channel Material	0	CY	
General Fill	4,732	CY	
Filter Material	10,545	CY	
Topsoil/ Growth Media	1,689	CY	12" thickness within Liner Area
Liner	71,179	SF	Includes all material and labor
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	0	LF	Assumes 0% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	0	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	0	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	0	LF	Assumes 0% of total length of bank treatment
Brushlayer Live Cuttings	0	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	0	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	0	LF	Assumes 0% of total length of bank treatment
Brushlayer Live Cuttings	0	EA	2 willow cuttings per linear fool of treatment
Slash for Brushlayer	0	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	0	EA	None
Riffle Material	0	CY	No. of riffles x 20' length x 10' width; 1ft thickness
Energy Dissipation Pool	0	EA	None
Boulders	0	EA	Based on bankfull width
Dissipation Pool Streambed Material	0	CY	Based on bankfull width, length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	0	EA	None
Foundation Logs	0	EA	0 per structure
Log with Rootwad	0	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	0	CY	2 CY per structure
Racking Material	0	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	0	EA	None
Log with Rootwad	0	EA	1 per structure
Retaining Log	0	EA	1 per structure
Tight Radius Jam Structure	0	EA	None
Foundation Logs	0	EA	3 per structure
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	7 CY per structure
Racking Material	0	EA	7 per structure
Bend Jam Structure	0	EA	None
Foundation Logs	0	EA	2 per structure
Log with Rootwad	0	EA	3 per structure
Whole Tree	0	EA	1 per structure
Small Woody Debris	0	CY	13 CY per structure
Racking Material	0	EA	15 per structure
Sweeper Log Structure	0	EA	None
Whole Tree	0	EA	1 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Channel Spanning Jam	0	EA	None
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Wood Habitat Structure	0	EA	None
Log with Rootwad	0	EA	4 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Turning Log Structure	0	EA	None
Log with Rootwad	0	EA	4 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Boulders	0	EA	2 per structure
Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	10 per Alcove
Oxbow Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	25 per Alcove
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre, intended for anually wet areas
Zone 2	376	EA	4840 plants per acre
Zone 3	297	EA	3825 plants per acre
Zone 4	1,102	EA	1891 plants per acre
Seeding			
Zone 2	0.08	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.08	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	0.58	AC	7.5' width each side of channel; 19.02 pure live seed/AC

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MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Meadow Creek - Hanger Flats DRSF - Reach MC3
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: ---

Drawing Name
MC3 Quantities

Drawing No.
MC3-2

MC4 PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
MC4	**1,925**	**2,843**	**1.5**	**2.34**	**1.58**

VICINITY MAP
1" = 5000'

EXISTING PSS WETLAND, TYP

32 D-17 NON-PERENNIAL SWALE

STREAM DIVERSION CHANNEL ABANDONED FOLLOWING CLOSURE OF TSF AND DRSF

HANGAR FLATS PIT LIMITS

HANGAR FLATS PIT LAKE

HANGAR FLATS PIT DIVERSION (150' STREAM CHANNEL AND CORRIDOR) ABANDONED FOLLOWING HANGAR FLATS PIT CLOSURE

PROPOSED MEADOW CREEK DIVERSION CHANNEL ALIGNMENT SEE MC5D OVERVIEW SHEET (DRAWING MC5D-1)

FLOODPLAIN WIDTH

DOWNSTREAM EXTENT OF STREAM CORRIDOR LINER

PROPOSED MEADOW CREEK CHANNEL ALIGNMENT SEE MC3 OVERVIEW SHEET (DRAWING MC3-1)

FLOW

ENERGY DISSIPATION BASIN 35 D-18

PROPOSED MEADOW CREEK CHANNEL ALIGNMENT MC4

PLUG MC4D DIVERSION CHANNELING MC4 FLOW INTO HANGAR FLATS PIT LAKE AND PREVENTING FLOW INTO MC4D FOLLOWING ABANDONMENT

PROPOSED MEADOW CREEK DIVERSION CHANNEL ALIGNMENT SEE MC4D OVERVIEW SHEET (DRAWING MC4D-1)

DRSF

DRSF LIMIT

STREAM DIVERSION CHANNEL ABANDONED FOLLOWING CLOSURE OF TSF AND DRSF

MEADOW CREEK EXISTING ALIGNMENT

ROUTE NON-PERENNIAL CHANNEL TO DIVERSION CHANNEL.

32 D-17

35 D-18 ENERGY DISSIPATION BASIN

EF MEADOW CREEK (BLOWOUT CREEK) EXISTING ALIGNMENT

PROPOSED EF MEADOW CREEK (BLOWOUT CREEK) CHANNEL ALIGNMENT SEE BC3 OVERVIEW SHEET (DRAWING BC3-1)

EXISTING PFO WETLAND, TYP

NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE INCLUDING DRSF AND HANGAR FLATS PIT IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE DRSF, HANGAR FLATS PIT, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. HANGAR FLATS PIT POOL DESIGN WATER SURFACE ELEVATION TO BE DETERMINED AS THE CHANNEL AND FLOODPLAIN DESIGN PROGRESSES.
4. NON-PERENNIAL STREAMS FROM SURROUNDING AREAS WILL BE ROUTED TO THE PROPOSED MEADOW CREEK CHANNEL.
5. PROPOSED WETLANDS ARE NOT SHOWN. SEE SHEET MC4-4 FOR WETLAND DESIGN.

MC4 PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
MC4	**2,843**	**180**

MEADOW CREEK REACH 4 – RESTORATION REACH SITE OVERVIEW PLAN

0 200 400 Feet

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Boise, Idaho 83705

MIDAS GOLD

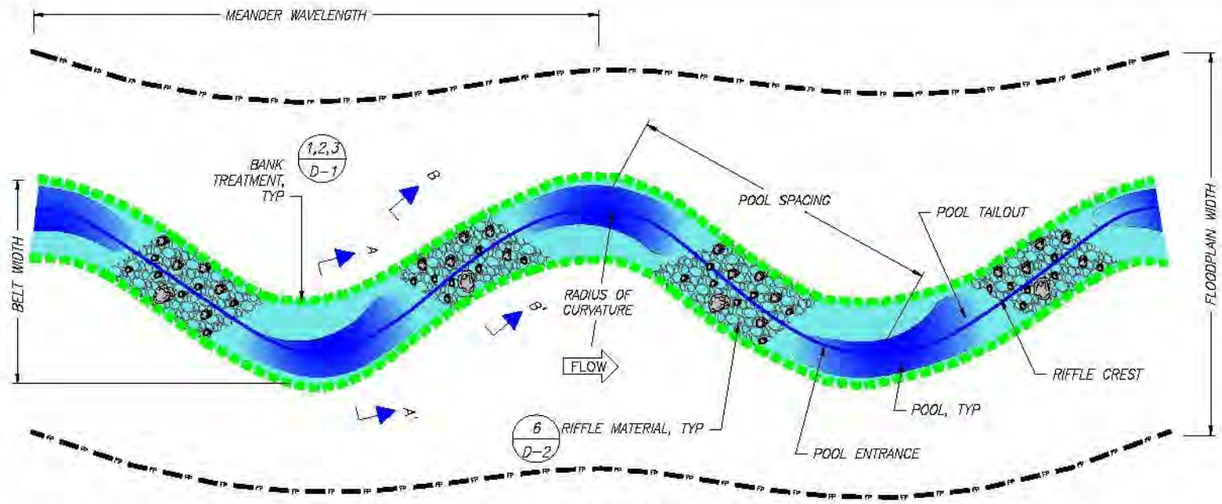
Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Meadow Creek - Hangar Flats Pit - Reach MC4
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: --

Drawing Name
MC4 Overview Sheet

Drawing No.
MC4-1



MEADOW REACH PLAN VIEW

NTS

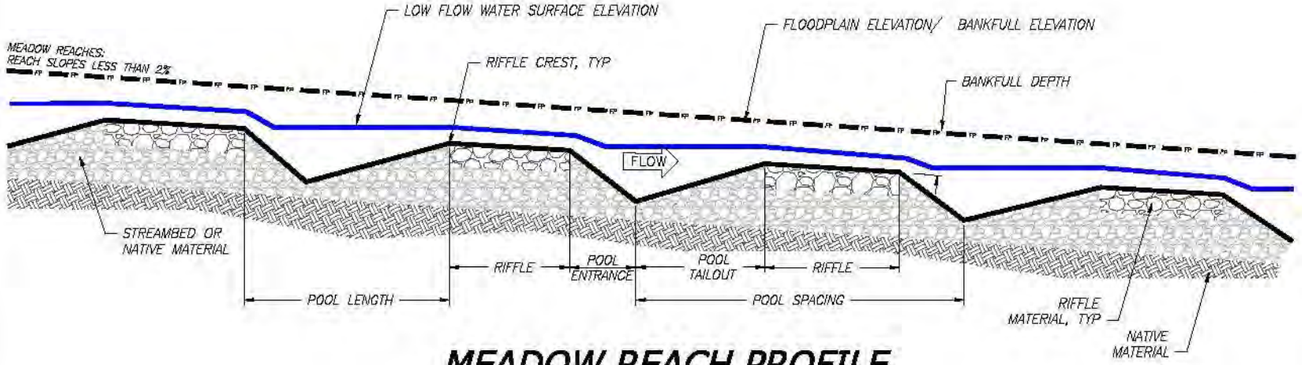
NOTES

1. CHANNEL AND FLOODPLAIN SHALL BE CONSTRUCTED TO THE DIMENSIONS IDENTIFIED IN THE CHANNEL DEFINITION TABLES AND AT THE LOCATIONS SHOWN IN INDIVIDUAL REACH OVERVIEW PLAN SHEETS.
2. CHANNEL SIZING FOR TYPICAL POOL AND RIFFLE CROSS SECTIONS IS BASED ON CHANNEL FORMING (BANKFULL) DESIGN FLOW. DETAILED TYPICAL SECTIONS FOR OTHER STREAM HABITATS WILL BE DEVELOPED IN A FUTURE DESIGN PHASE.
3. BANK TREATMENT TYPES ARE NOT DEPICTED IN THE TYPICAL POOL AND RIFFLE SECTIONS. SEE SHEETS D-1 AND D-2 FOR BANK TREATMENT DETAILS.
4. SEE SHEETS D-3 THROUGH D-10 FOR HABITAT STRUCTURE DETAILS.
5. HABITAT STRUCTURE SPACING AND ASSOCIATED QUANTITIES ARE SUMMARIZED IN INDIVIDUAL REACH QUANTITY SHEETS.
6. SEE SHEETS D-1 AND D-20 FOR PLANTING AND SEEDING DETAILS AND PLANTING SCHEDULES.
7. SEE SHEETS D-13 THROUGH D-14 FOR TYPICAL FLOODPLAIN CROSS SECTIONS.

MC4 – MEADOW REACH
PROPOSED CHANNEL DEFINITION TABLES

PLAN TABLE

REACH ID	BANKFULL FLOW (CFS)	BANKFULL WIDTH (FT)	WIDTH/ DEPTH RATIO	AVERAGE DEPTH AT BANKFULL (FT)	MEANDER WAVELENGTH (FT)	MEANDER BELT WIDTH (FT)	RADIUS OF CURVATURE (FT)	AVG POOL SPACING (FT)	FLOODPLAIN WIDTH (FT)
MC4	**89**	**16**	**13**	**1.3**	**155 - 200**	**85 - 120**	**25 - 95**	**65 - 200**	**120 - 240**



MEADOW REACH PROFILE

NTS

PROFILE TABLE

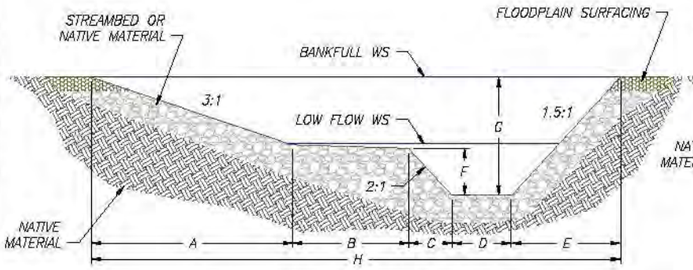
REACH ID	RIFFLE LENGTH (FT)	POOL LENGTH (FT)	POOL ENTRANCE SLOPE (%)	POOL TAILOUT SLOPE (%)
MC4	**25 - 185**	**15 - 40**	**35 - 45**	**18 - 42**

MATERIALS TABLE

REACH ID	STREAMBED MATERIAL TYPE	STREAMBED MATERIAL AVG THICKNESS (FT)	RIFFLE MATERIAL TYPE	RIFFLE MATERIAL AVG THICKNESS (FT)	FLOODPLAIN MATERIAL TYPE	FLOODPLAIN MATERIAL AVG THICKNESS (FT)	FLOODPLAIN SURFACING TYPE	FLOODPLAIN SURFACING AVG THICKNESS (FT)
MC4								

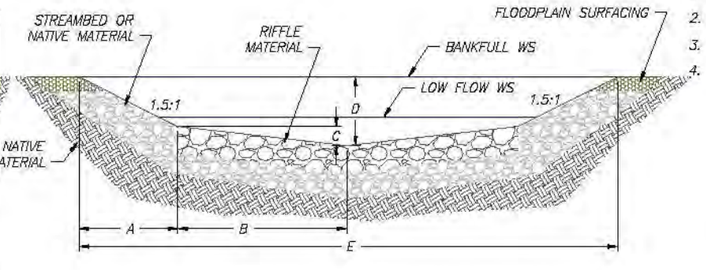
NOTES

1. MATERIALS TABLE TO BE DEVELOPED IN FUTURE DESIGN.
2. STREAMBED MATERIAL TYPES: S1 (D50 = XX"), S2 (D50 = XX"), S3 (D50 = XX").
3. RIFFLE MATERIAL TYPES: S1, S2, S3, R1 (D50 = XX"), R2 (D50 = XX").
4. FLOODPLAIN SURFACING MATERIAL TYPES: GROWTH MEDIA, ALGAE, HYDROMULCH, OR NONE.



POOL SECTION A-A'

NTS



RIFFLE SECTION B-B'

NTS

SECTIONS TABLE

SECTION	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)	F (FT)	G (FT)	H (FT)
POOL SECTION A - A'	**3.4**	**3.0**	**6.8**	**5.7**	**6.8**	**3.4**	**4.6**	**25.8**
RIFFLE SECTION B - B'	**1.8**	**6.0**	**0.6**	**1.8**	**16.1**			

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MIDAS GOLD

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Meadow Creek - Hangar Flats Pit - Reach MC4
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: ---

Drawing Name
MC4 Typical Plan and Profile

Drawing No.
MC4-2

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Medium complexity for water managment
Stormwater Management			
BMPs and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	Low complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	9,923	CY	
Floodplain Excavation (Cut)	20,139	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	0	CY	
Engineered Streambed Material	7,719	CY	2843 LF of new channel; 4.55 FT average streambed thickness
Sorting and Stockpiling [3]	0	CY	
Rock Armoring/ Grade Control	0	CY	
Ephemeral Swale Channel Material	13	CY	180 LF of new channel; 0.5 FT gravel thickness; 2' SF XS area
General Fill	5,216	CY	
Filter Material	0	CY	
Topsoil/ Growth Media	20,139	CY	12" thickness within Liner Area
Liner	0	SF	
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	2,843	LF	Assumes 50% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	5,686	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	5,686	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	1,895	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	11,372	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	853	LF	Assumes 15% of total length of bank treatment
Brushlayer Live Cuttings	1,706	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	239	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	853	LF	Assumes 15% of total length of bank treatment
Brushlayer Live Cuttings	1,706	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	119	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	32	EA	2 per channel meander wave length
Riffle Material	237	CY	No. of riffles x 20' length x 10' width; 1ft thickness
Energy Dissipation Pool	0	EA	None
Boulders	0	EA	Based on bankfull width
Dissipation Pool Streambed Material	0	CY	Based on bankfull width, length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	8	EA	1 every 2 channel meander wave lengths
Foundation Logs	0	EA	0 per structure
Log with Rootwad	24	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	16	CY	2 CY per structure
Racking Material	16	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	57	EA	1 per 50 linear feet of new channel
Log with Rootwad	57	EA	1 per structure
Retaining Log	57	EA	1 per structure
Tight Radius Jam Structure	2	EA	1 every 8 channel meander wave lengths
Foundation Logs	14	EA	3 per structure
Log with Rootwad	12	EA	3 per structure
Small Woody Debris	26	CY	7 CY per structure
Racking Material	28	EA	7 per structure
Bend Jam Structure	4	EA	1 every 4 channel meander wave lengths
Foundation Logs	8	EA	2 per structure
Log with Rootwad	12	EA	3 per structure
Whole Tree	8	EA	1 per structure
Small Woody Debris	52	CY	13 CY per structure
Racking Material	60	EA	15 per structure
Sweeper Log Structure	8	EA	1 every 2 channel meander wave lengths
Whole Tree	8	EA	1 per structure
Small Woody Debris	24	CY	3 CY per structure
Racking Material	24	EA	3 per structure
Channel Spanning Jam	0	EA	None
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Wood Habitat Structure	4	EA	1 every 4 channel meander wave lengths
Log with Rootwad	16	EA	4 per structure
Small Woody Debris	12	CY	3 CY per structure
Racking Material	12	EA	3 per structure
Turning Log Structure	2	EA	1 every 8 channel meander wave lengths
Log with Rootwad	8	EA	4 per structure
Small Woody Debris	6	CY	3 CY per structure
Racking Material	6	EA	3 per structure
Boulders	4	EA	2 per structure
Backwater Alcove	2	EA	No. varies by reach
Log with Rootwad	20	EA	10 per Alcove
Oxbow Backwater Alcove	2	EA	No. varies by reach
Log with Rootwad	50	EA	25 per Alcove
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre, intended for anually wet areas
Zone 2	632	EA	4840 plants per acre
Zone 3	499	EA	3825 plants per acre
Zone 4	1,234	EA	1891 plants per acre
Seeding			
Zone 2	0.13	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.13	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	0.65	AC	5' width each side of channel; 19.02 pure live seed/AC

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MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Meadow Creek - Hangar Flats Pit - Reach MC4
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: ---

Drawing Name
MC4 Quantities

Drawing No.
MC4-3

MEADOW CREEK REACH 4 WETLANDS PLANTING PLAN

NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON DRSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE DRSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. SEE LEGEND SHEET G6

0 200

TETRA TECH

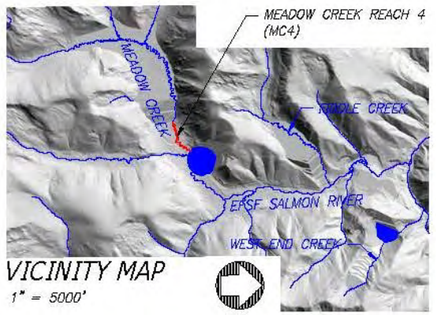
MIDAS GOLD

Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: --

Drawing Name
MC4 Wetland Planting Sheet

Drawing No.
MC4-4



VICINITY MAP
1" = 5000'

NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE INCLUDING DRSF AND HANGAR FLATS PIT IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE DRSF, HANGAR FLATS PIT, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. SEE LEGEND SHEET G6.

MEADOW CREEK REACH 4 WETLAND PLANTING PLAN

0 200

TETRA TECH

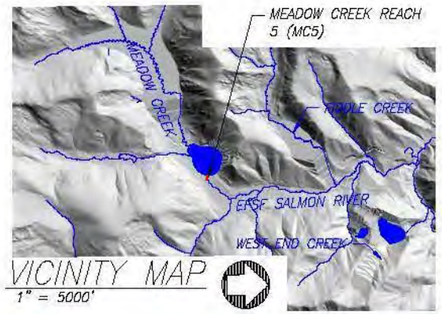
MIDAS GOLD

Draft

Date: Feb. 2019
Designed: LC, JHD
Drawn: JHD
Checked: LC
Approved: ---

Drawing Name
MC4 Wetland Planting Sheet

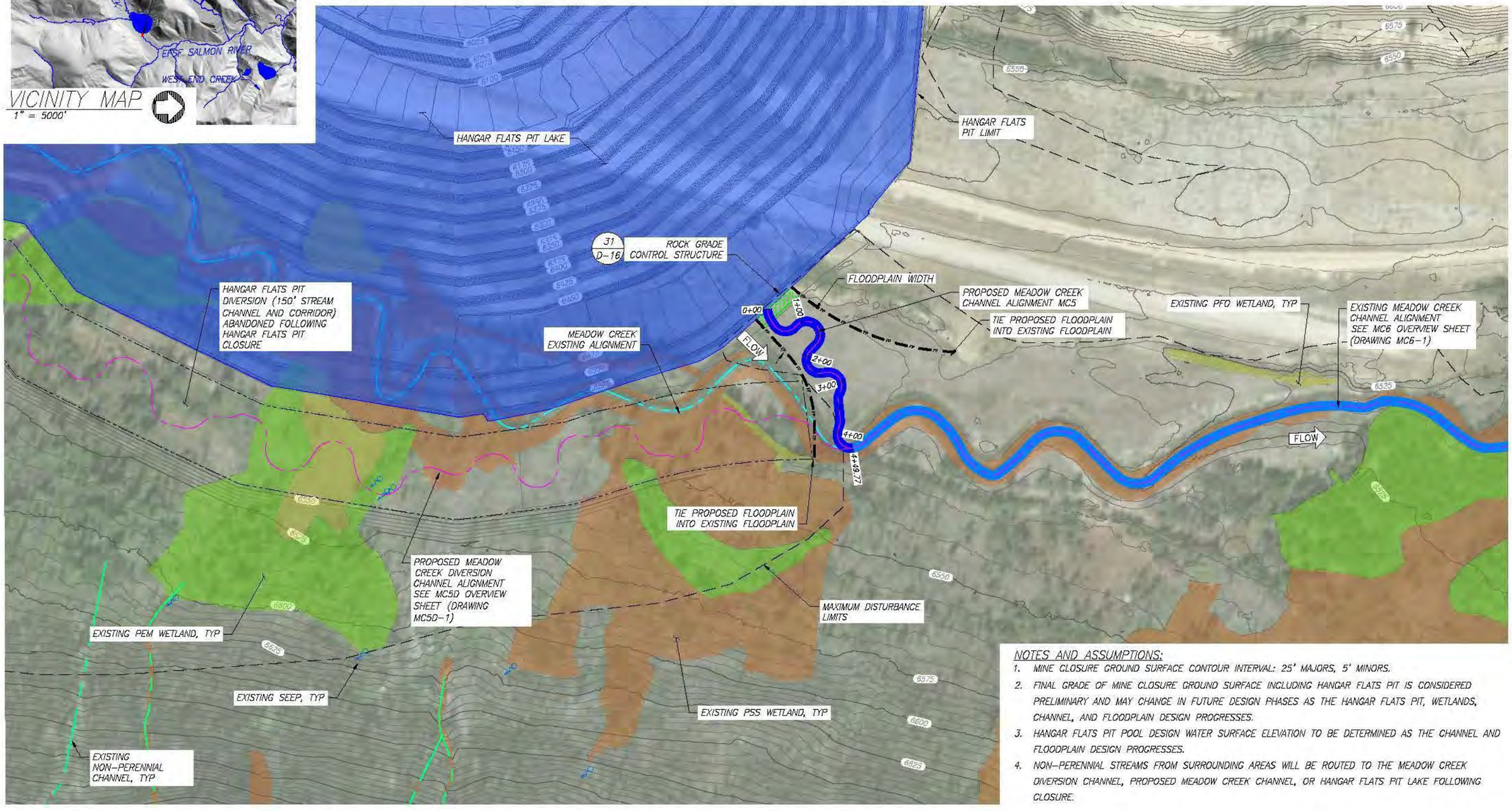
Drawing No.
MC4-5



VICINITY MAP
1" = 5000'

MC5 PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
MC5	345	450	1.3	0.58	0.44

MC5 PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
MC5	450	0



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE INCLUDING HANGAR FLATS PIT IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE HANGAR FLATS PIT, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. HANGAR FLATS PIT POOL DESIGN WATER SURFACE ELEVATION TO BE DETERMINED AS THE CHANNEL AND FLOODPLAIN DESIGN PROGRESSES.
4. NON-PERENNIAL STREAMS FROM SURROUNDING AREAS WILL BE ROUTED TO THE MEADOW CREEK DIVERSION CHANNEL, PROPOSED MEADOW CREEK CHANNEL, OR HANGAR FLATS PIT LAKE FOLLOWING CLOSURE.

MEADOW CREEK REACH 5 – RESTORATION REACH SITE OVERVIEW PLAN

0 200 400 Feet

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MIDAS GOLD

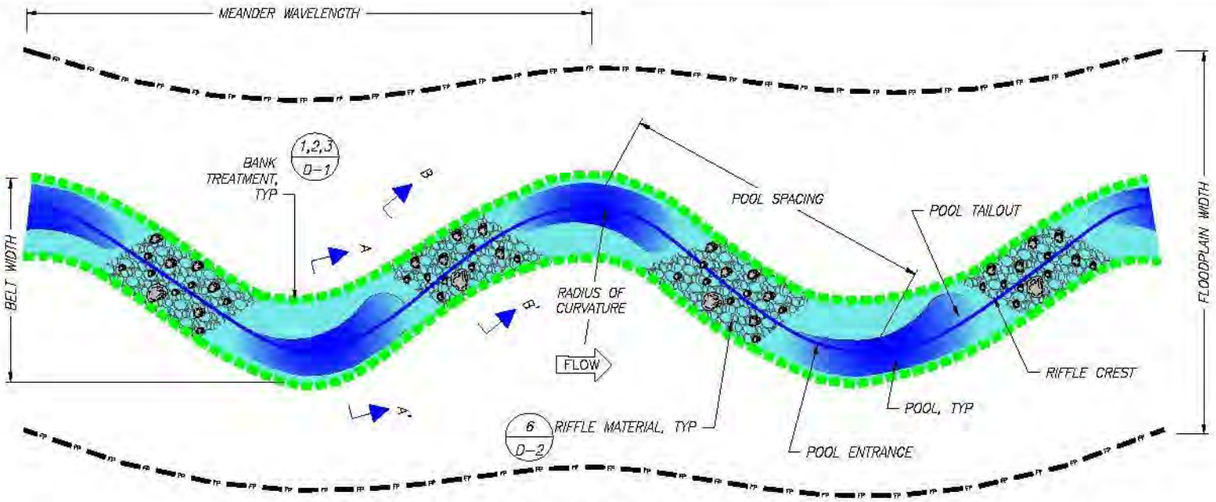
Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Meadow Creek - Hangar Flats Pit - Reach MC5
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: --

Drawing Name
MC5 Overview Sheet

Drawing No.
MC5-1



MEADOW REACH PLAN VIEW

NTS

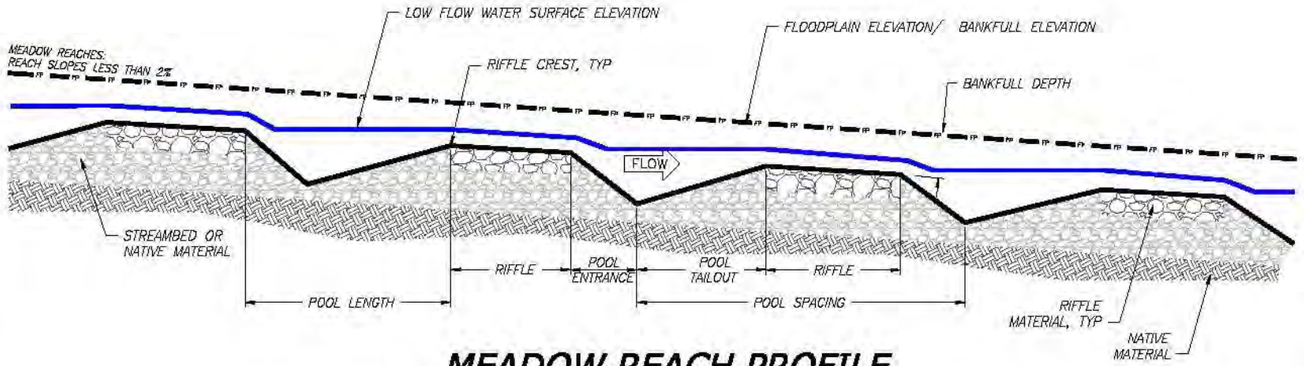
NOTES

1. CHANNEL AND FLOODPLAIN SHALL BE CONSTRUCTED TO THE DIMENSIONS IDENTIFIED IN THE CHANNEL DEFINITION TABLES AND AT THE LOCATIONS SHOWN IN INDIVIDUAL REACH OVERVIEW PLAN SHEETS.
2. CHANNEL SIZING FOR TYPICAL POOL AND RIFFLE CROSS SECTIONS IS BASED ON CHANNEL FORMING (BANKFULL) DESIGN FLOW. DETAILED TYPICAL SECTIONS FOR OTHER STREAM HABITATS WILL BE DEVELOPED IN A FUTURE DESIGN PHASE.
3. BANK TREATMENT TYPES ARE NOT DEPICTED IN THE TYPICAL POOL AND RIFFLE SECTIONS. SEE SHEETS D-1 AND D-2 FOR BANK TREATMENT DETAILS.
4. SEE SHEETS D-3 THROUGH D-10 FOR HABITAT STRUCTURE DETAILS.
5. HABITAT STRUCTURE SPACING AND ASSOCIATED QUANTITIES ARE SUMMARIZED IN INDIVIDUAL REACH QUANTITY SHEETS.
6. SEE SHEETS D-1 AND D-20 FOR PLANTING AND SEEDING DETAILS AND PLANTING SCHEDULES.
7. SEE SHEETS D-13 THROUGH D-14 FOR TYPICAL FLOODPLAIN CROSS SECTIONS.

MC5 – MEADOW REACH
PROPOSED CHANNEL DEFINITION TABLES

PLAN TABLE

REACH ID	BANKFULL FLOW (CFS)	BANKFULL WIDTH (FT)	WIDTH/ DEPTH RATIO	AVERAGE DEPTH AT BANKFULL (FT)	MEANDER WAVELENGTH (FT)	MEANDER BELT WIDTH (FT)	RADIUS OF CURVATURE (FT)	AVG POOL SPACING (FT)	FLOODPLAIN WIDTH (FT)
MC5	**108**	**17**	**10**	**1.6**	**160 - 210**	**85 - 165**	**25 - 100**	**65 - 210**	**165 - 325**



MEADOW REACH PROFILE

NTS

PROFILE TABLE

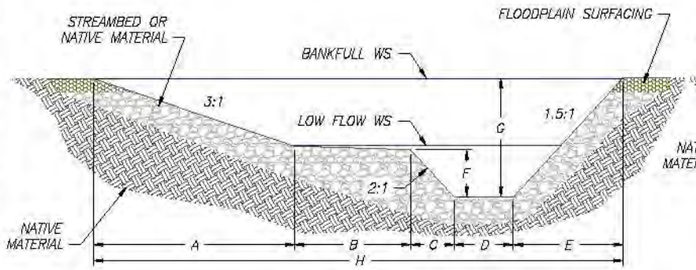
REACH ID	RIFFLE LENGTH (FT)	POOL LENGTH (FT)	POOL ENTRANCE SLOPE (%)	POOL TAILOUT SLOPE (%)
MC5	**25 - 190**	**15 - 40**	**42 - 45**	**21 - 50**

MATERIALS TABLE

REACH ID	STREAMBED MATERIAL TYPE	STREAMBED MATERIAL AVG THICKNESS (FT)	RIFFLE MATERIAL TYPE	RIFFLE MATERIAL AVG THICKNESS (FT)	FLOODPLAIN MATERIAL TYPE	FLOODPLAIN MATERIAL AVG THICKNESS (FT)	FLOODPLAIN SURFACING TYPE	FLOODPLAIN SURFACING AVG THICKNESS (FT)
MC5								

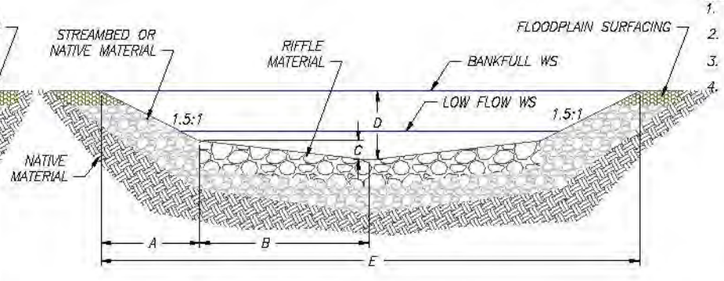
NOTES

1. MATERIALS TABLE TO BE DEVELOPED IN FUTURE DESIGN.
2. STREAMBED MATERIAL TYPES: S1 (D50 = XX"), S2 (D50 = XX"), S3 (D50 = XX").
3. RIFFLE MATERIAL TYPES: S1, S2, S3, R1 (D50 = XX"), R2 (D50 = XX").
4. FLOODPLAIN SURFACING MATERIAL TYPES: GROWTH MEDIA, ALGAE, HYDROMULCH, OR NONE.



POOL SECTION A-A'

NTS



RIFFLE SECTION B-B'

NTS

SECTIONS TABLE

SECTION	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)	F (FT)	G (FT)	H (FT)
POOL SECTION A - A'	**4.2**	**1.9**	**8.4**	**3.8**	**8.4**	**4.2**	**5.6**	**26.7**
RIFFLE SECTION B - B'	**2.4**	**6.0**	**0.6**	**2.2**	**16.7**			

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MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Meadow Creek - Hangar Flats Pit - Reach MC5
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: ---

Drawing Name
MC5 Typical Plan and Profile

Drawing No.
MC5-2

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Low complexity for water managment
Stormwater Management			
BMPs and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	Low complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	3,403	CY	
Floodplain Excavation (Cut)	2,334	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	0	CY	
Engineered Streambed Material	2,058	CY	450 LF of new channel; 7 FT average streambed thickness
Sorting and Stockpiling [3]	0	CY	
Rock Armoring/ Grade Control	778	CY	(1) grade control structure; floodplain width x 30' x max scour depth
Ephemeral Swale Channel Material	0	CY	
General Fill	0	CY	
Filter Material	0	CY	
Topsoil/ Growth Media	2,334	CY	12" thickness within Liner Area
Liner	0	SF	
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	450	LF	Assumes 50% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	900	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	900	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	300	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	1,800	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	135	LF	Assumes 15% of total length of bank treatment
Brushlayer Live Cuttings	270	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	38	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	135	LF	Assumes 15% of total length of bank treatment
Brushlayer Live Cuttings	270	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	19	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	5	EA	2 per channel meander wave length
Riffle Material	36	CY	No. of riffles x 20' length x 10' width; 1ft thickness
Energy Dissipation Pool	0	EA	None
Boulders	0	EA	Based on bankfull width
Dissipation Pool Streambed Material	0	CY	Based on bankfull width, length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	1	EA	1 every 2 channel meander wave lengths
Foundation Logs	0	EA	0 per structure
Log with Rootwad	4	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	2	CY	2 CY per structure
Racking Material	2	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	9	EA	1 per 50 linear feet of new channel
Log with Rootwad	9	EA	1 per structure
Retaining Log	9	EA	1 per structure
Tight Radius Jam Structure	0	EA	1 every 6 channel meander wave lengths
Foundation Logs	3	EA	3 per structure
Log with Rootwad	2	EA	3 per structure
Small Woody Debris	5	CY	7 CY per structure
Racking Material	6	EA	7 per structure
Bend Jam Structure	1	EA	1 every 3 channel meander wave lengths
Foundation Logs	2	EA	2 per structure
Log with Rootwad	2	EA	3 per structure
Whole Tree	2	EA	1 per structure
Small Woody Debris	10	CY	13 CY per structure
Racking Material	12	EA	15 per structure
Sweeper Log Structure	1	EA	1 every 2 channel meander wave lengths
Whole Tree	1	EA	1 per structure
Small Woody Debris	4	CY	3 CY per structure
Racking Material	4	EA	3 per structure
Channel Spanning Jam	2	EA	No. varies by reach
Log with Rootwad	6	EA	3 per structure
Small Woody Debris	6	CY	3 CY per structure
Racking Material	6	EA	3 per structure
Wood Habitat Structure	1	EA	1 every 2 channel meander wave lengths
Log with Rootwad	5	EA	4 per structure
Small Woody Debris	4	CY	3 CY per structure
Racking Material	4	EA	3 per structure
Turning Log Structure	0	EA	None
Log with Rootwad	0	EA	4 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Boulders	0	EA	2 per structure
Backwater Alcove	1	EA	No. varies by reach
Log with Rootwad	10	EA	10 per Alcove
Oxbow Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	25 per Alcove
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre, intended for anually wet areas
Zone 2	100	EA	4840 plants per acre
Zone 3	79	EA	3825 plants per acre
Zone 4	195	EA	1891 plants per acre
Seeding			
Zone 2	0.02	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.02	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	0.10	AC	5' width each side of channel; 19.02 pure live seed/AC

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MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Meadow Creek - Hangar Flats Pit - Reach MC5
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: ---

Drawing Name
MC5 Quantities

Drawing No.
MC5-3

VICINITY MAP
1" = 5000'

NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE INCLUDING HANGAR FLATS PIT IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE HANGAR FLATS PIT, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. SEE LEGEND SHEET G6

MEADOW CREEK REACH 5 WETLAND PLANTING PLAN

0 200

MIDAS GOLD

Draft

Date: Feb. 2019
Designed: LC, JHD
Drawn: JHD
Checked: LC
Approved: --

Drawing Name
MC5 Wetland Planting Sheet

Drawing No.
MC5-4

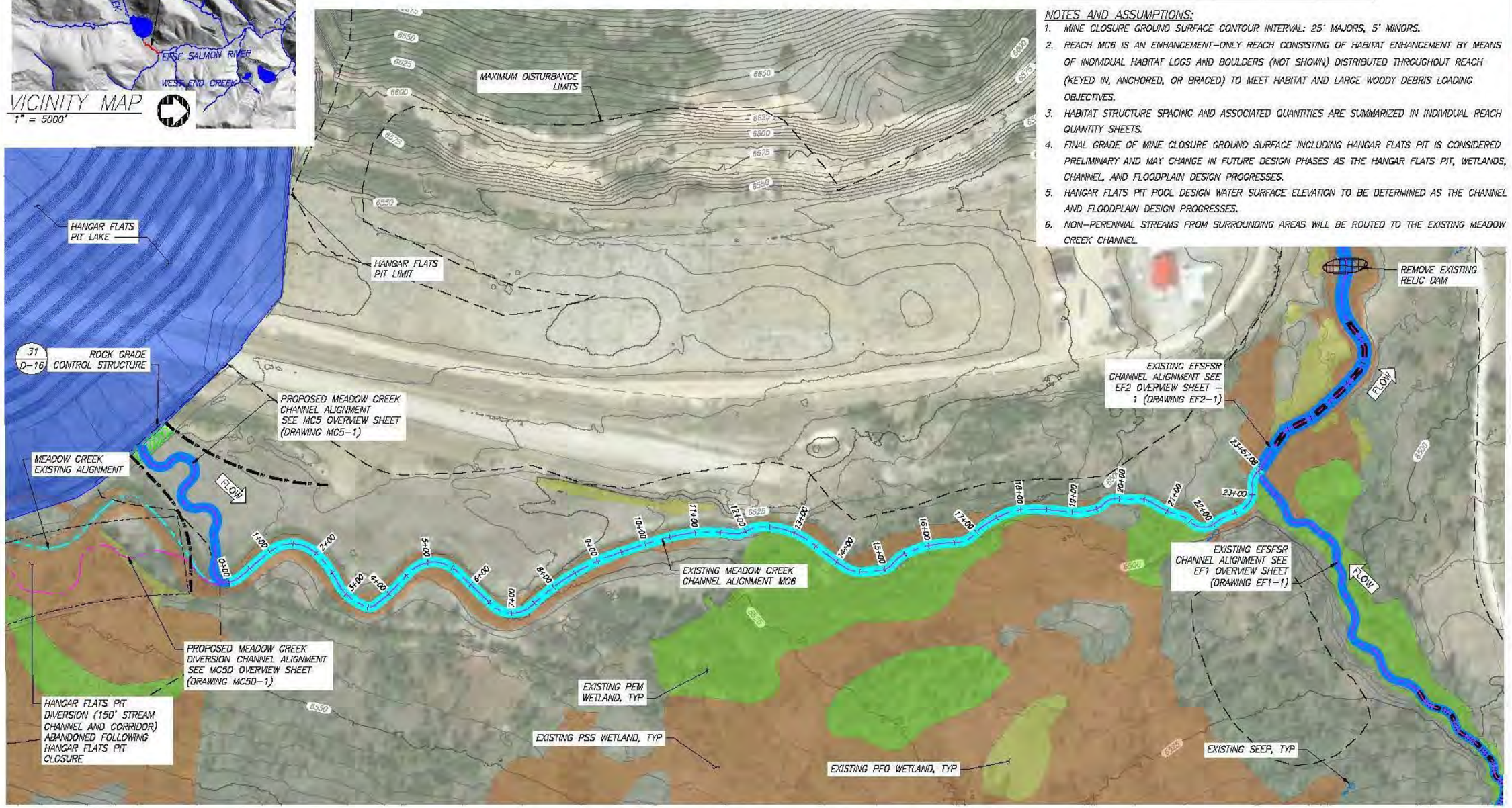
VICINITY MAP
1" = 5000'

MC6 PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
MC6	2,057	2,357	1.1	2.28	1.99

MC6 PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
MC6	2,357	0

NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. REACH MC6 IS AN ENHANCEMENT-ONLY REACH CONSISTING OF HABITAT ENHANCEMENT BY MEANS OF INDIVIDUAL HABITAT LOGS AND BOULDERS (NOT SHOWN) DISTRIBUTED THROUGHOUT REACH (KEYED IN, ANCHORED, OR BRACED) TO MEET HABITAT AND LARGE WOODY DEBRIS LOADING OBJECTIVES.
3. HABITAT STRUCTURE SPACING AND ASSOCIATED QUANTITIES ARE SUMMARIZED IN INDIVIDUAL REACH QUANTITY SHEETS.
4. FINAL GRADE OF MINE CLOSURE GROUND SURFACE INCLUDING HANGAR FLATS PIT IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE HANGAR FLATS PIT, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
5. HANGAR FLATS PIT POOL DESIGN WATER SURFACE ELEVATION TO BE DETERMINED AS THE CHANNEL AND FLOODPLAIN DESIGN PROGRESSES.
6. NON-PERENNIAL STREAMS FROM SURROUNDING AREAS WILL BE ROUTED TO THE EXISTING MEADOW CREEK CHANNEL.



MEADOW CREEK REACH 6 - ENHANCEMENT REACH
SITE OVERVIEW PLAN

0 200 400 Feet

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MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Meadow Creek - Hangar Flats Pit - Reach MC6
Valley County, Idaho

Draft

Date:	Feb. 2019
Designed:	JE, JY, MP
Drawn:	JE, JY, MP
Checked:	RR
Approved:	--

Drawing Name
MC6 Overview Sheet

Drawing No.
MC6-1

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Medium complexity for water managment
Stormwater Management			
BMPs and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	Low complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	0	CY	
Floodplain Excavation (Cut)	0	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	0	CY	
Engineered Streambed Material	0	CY	
Sorting and Stockpiling [3]	0	CY	
Rock Armoring/ Grade Control	0	CY	
Ephemeral Swale Channel Material	0	CY	
General Fill	0	CY	
Filter Material	0	CY	
Topsoil/ Growth Media	0	CY	12" thickness within Liner Area
Liner	0	SF	
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	0	LF	Assumes 0% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	0	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	0	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	0	LF	Assumes 0% of total length of bank treatment
Brushlayer Live Cuttings	0	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	0	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	0	LF	Assumes 0% of total length of bank treatment
Brushlayer Live Cuttings	0	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	0	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	0	EA	None
Riffle Material	0	CY	No. of riffles x 20' length x 10' width; 1ft thickness
Energy Dissipation Pool	0	EA	None
Boulders	0	EA	Based on bankfull width
Dissipation Pool Streambed Material	0	CY	Based on bankfull width, length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	6	EA	1 every 2 channel meander wave lengths
Foundation Logs	0	EA	0 per structure
Log with Rootwad	19	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	13	CY	2 CY per structure
Racking Material	13	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	47	EA	1 per 50 linear feet of new channel
Log with Rootwad	47	EA	1 per structure
Retaining Log	47	EA	1 per structure
Tight Radius Jam Structure	2	EA	1 every 6 channel meander wave lengths
Foundation Logs	15	EA	3 per structure
Log with Rootwad	13	EA	3 per structure
Small Woody Debris	27	CY	7 CY per structure
Racking Material	29	EA	7 per structure
Bend Jam Structure	4	EA	1 every 3 channel meander wave lengths
Foundation Logs	8	EA	2 per structure
Log with Rootwad	13	EA	3 per structure
Whole Tree	8	EA	1 per structure
Small Woody Debris	54	CY	13 CY per structure
Racking Material	63	EA	15 per structure
Sweeper Log Structure	6	EA	1 every 2 channel meander wave lengths
Whole Tree	6	EA	1 per structure
Small Woody Debris	19	CY	3 CY per structure
Racking Material	19	EA	3 per structure
Channel Spanning Jam	4	EA	No. varies by reach
Log with Rootwad	12	EA	3 per structure
Small Woody Debris	12	CY	3 CY per structure
Racking Material	12	EA	3 per structure
Wood Habitat Structure	6	EA	1 every 2 channel meander wave lengths
Log with Rootwad	25	EA	4 per structure
Small Woody Debris	19	CY	3 CY per structure
Racking Material	19	EA	3 per structure
Turning Log Structure	2	EA	1 every 6 channel meander wave lengths
Log with Rootwad	8	EA	4 per structure
Small Woody Debris	6	CY	3 CY per structure
Racking Material	6	EA	3 per structure
Boulders	4	EA	2 per structure
Backwater Alcove	3	EA	No. varies by reach
Log with Rootwad	30	EA	10 per Alcove
Oxbow Backwater Alcove	1	EA	No. varies by reach
Log with Rootwad	25	EA	25 per Alcove
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre, intended for anually wet areas
Zone 2	524	EA	4840 plants per acre
Zone 3	414	EA	3825 plants per acre
Zone 4	1,023	EA	1891 plants per acre
Seeding			
Zone 2	0.11	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.11	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	0.54	AC	5' width each side of channel; 19.02 pure live seed/AC

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MIDAS GOLD

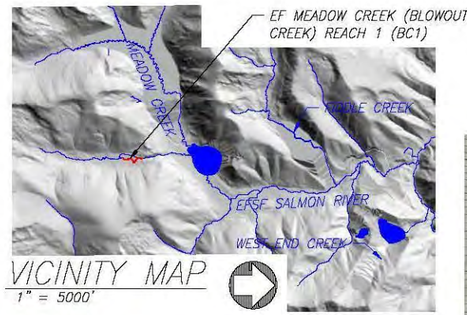
Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Meadow Creek - Hangar Flats Pit - Reach MC6
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: ---

Drawing Name
MC6 Quantities

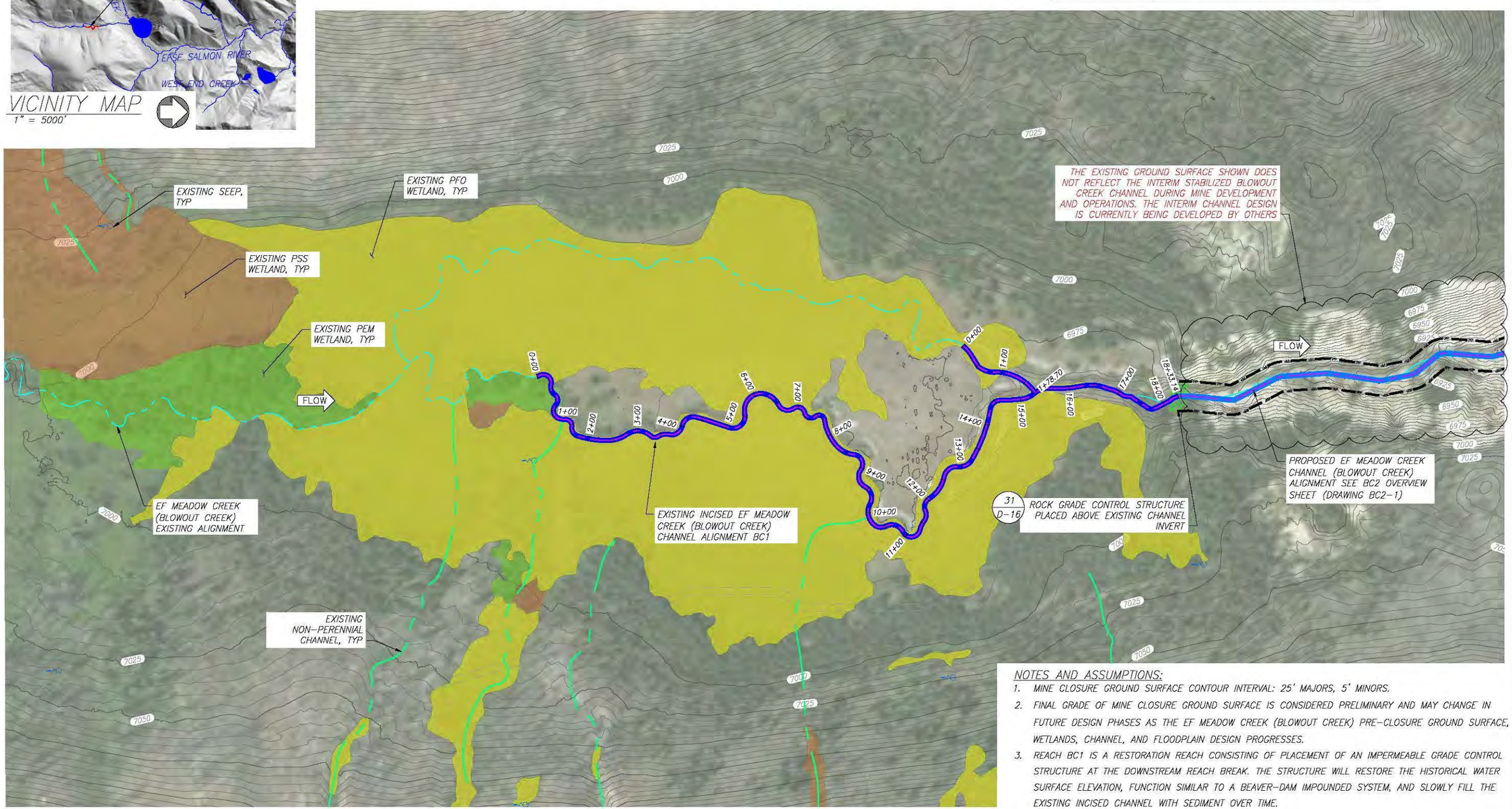
Drawing No.
MC6-2



VICINITY MAP
1" = 5000'

BC1 PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
BC1	1,615	1,833	1.1	0.74	0.65

BC1 PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
BC1	2,012	0



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE EF MEADOW CREEK (BLOWOUT CREEK) PRE-CLOSURE GROUND SURFACE, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. REACH BC1 IS A RESTORATION REACH CONSISTING OF PLACEMENT OF AN IMPERMEABLE GRADE CONTROL STRUCTURE AT THE DOWNSTREAM REACH BREAK. THE STRUCTURE WILL RESTORE THE HISTORICAL WATER SURFACE ELEVATION, FUNCTION SIMILAR TO A BEAVER-DAM IMPOUNDED SYSTEM, AND SLOWLY FILL THE EXISTING INCISED CHANNEL WITH SEDIMENT OVER TIME.

0 200 400 Feet

EF MEADOW CREEK (BLOWOUT CREEK) REACH 1 – RESTORATION REACH SITE OVERVIEW PLAN

Applied Science & Engineering
2449 S. Vista Ave. Suite B
Boise, Idaho 83705

MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Blowout Creek - BC Restoration - Reach BC1
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: --

Drawing Name
BC1 Overview Sheet

Drawing No.
BC1-1

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Medium complexity for water management
Stormwater Management			
BMPs and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	High complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	0	CY	
Floodplain Excavation (Cut)	0	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	0	CY	
Engineered Streambed Material [3]	0	CY	
Sorting and Stockpiling [3]	0	CY	
Rock Armoring/ Grade Control [3]	1,550	CY	Grade control structure at BC1 outlet
Ephemeral Swale Channel Material	0	CY	
General Fill	0	CY	
Filter Material	0	CY	
Topsoil/ Growth Media [3]	0	CY	
Liner	0	SF	
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	0	LF	Assumes 0% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	0	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	0	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	0	LF	Assumes 0% of total length of bank treatment
Brushlayer Live Cuttings	0	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	0	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	0	LF	Assumes 0% of total length of bank treatment
Brushlayer Live Cuttings	0	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	0	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	0	EA	None
Riffle Material	0	CY	No. of riffles x 20' length x 10' width; 1ft thickness
Energy Dissipation Pool	0	EA	None
Boulders	0	EA	Based on bankfull width
Dissipation Pool Streambed Material	0	CY	Based on bankfull width, length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	16	EA	1 every 1 channel meander wave lengths
Foundation Logs	0	EA	0 per structure
Log with Rootwad	48	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	32	CY	2 CY per structure
Racking Material	32	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	40	EA	1 per 50 linear feet of new channel
Log with Rootwad	40	EA	1 per structure
Retaining Log	40	EA	1 per structure
Tight Radius Jam Structure	2	EA	1 every 8 channel meander wave lengths
Foundation Logs	14	EA	3 per structure
Log with Rootwad	12	EA	3 per structure
Small Woody Debris	26	CY	7 CY per structure
Racking Material	28	EA	7 per structure
Bend Jam Structure	2	EA	1 every 8 channel meander wave lengths
Foundation Logs	4	EA	2 per structure
Log with Rootwad	6	EA	3 per structure
Whole Tree	4	EA	1 per structure
Small Woody Debris	26	CY	13 CY per structure
Racking Material	30	EA	15 per structure
Sweeper Log Structure	4	EA	1 every 4 channel meander wave lengths
Whole Tree	4	EA	1 per structure
Small Woody Debris	12	CY	3 CY per structure
Racking Material	12	EA	3 per structure
Channel Spanning Jam	0	EA	None
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Wood Habitat Structure	4	EA	1 every 4 channel meander wave lengths
Log with Rootwad	16	EA	4 per structure
Small Woody Debris	12	CY	3 CY per structure
Racking Material	12	EA	3 per structure
Turning Log Structure	2	EA	1 every 8 channel meander wave lengths
Log with Rootwad	8	EA	4 per structure
Small Woody Debris	6	CY	3 CY per structure
Racking Material	6	EA	3 per structure
Boulders	4	EA	2 per structure
Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	10 per Alcove
Oxbow Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	25 per Alcove
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre, intended for anually wet areas
Zone 2	447	EA	4840 plants per acre
Zone 3	353	EA	3825 plants per acre
Zone 4	873	EA	1891 plants per acre
Seeding			
Zone 2	0.09	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.09	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	0.46	AC	5' width each side of channel; 19.02 pure live seed/AC

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MIDAS GOLD

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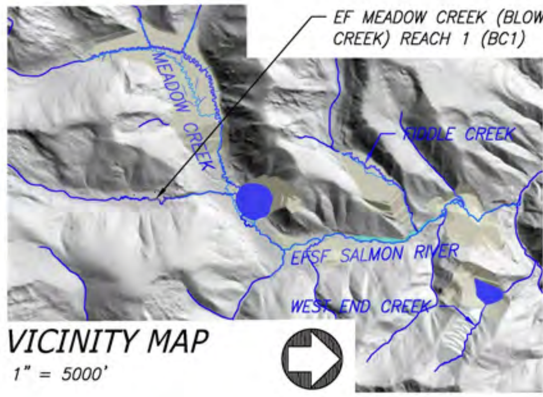
Blowout Creek - BC Restoration - Reach BC1
Valley County, Idaho

Draft

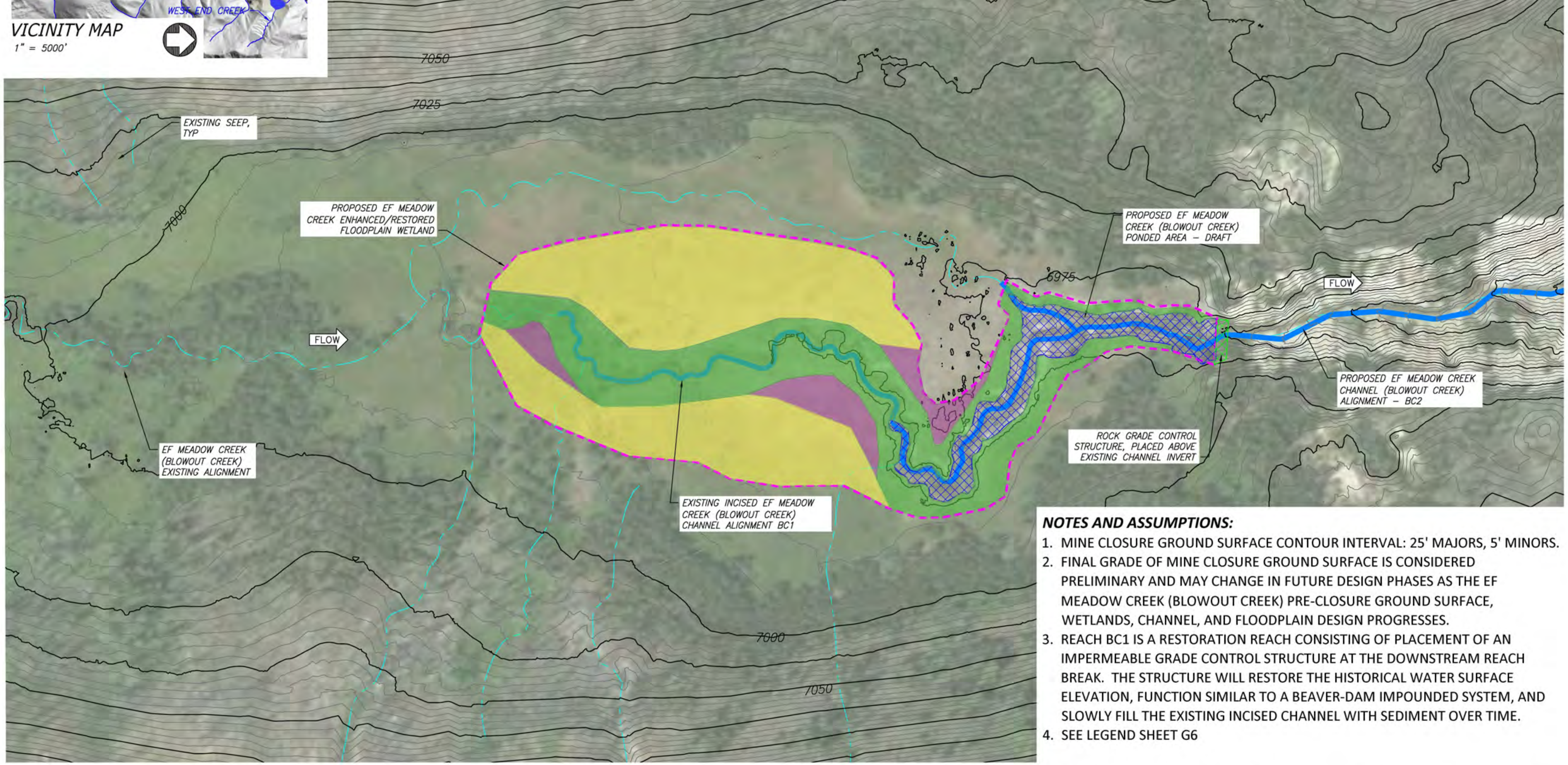
Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: ---

Drawing Name
BC1 Quantities

Drawing No.
BC1-2



VICINITY MAP
1" = 5000'



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE EF MEADOW CREEK (BLOWOUT CREEK) PRE-CLOSURE GROUND SURFACE, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. REACH BC1 IS A RESTORATION REACH CONSISTING OF PLACEMENT OF AN IMPERMEABLE GRADE CONTROL STRUCTURE AT THE DOWNSTREAM REACH BREAK. THE STRUCTURE WILL RESTORE THE HISTORICAL WATER SURFACE ELEVATION, FUNCTION SIMILAR TO A BEAVER-DAM IMPOUNDED SYSTEM, AND SLOWLY FILL THE EXISTING INCISED CHANNEL WITH SEDIMENT OVER TIME.
4. SEE LEGEND SHEET G6

EF MEADOW CREEK (BLOWOUT CREEK) REACH 1 - ENHANCEMENT REACH WETLANDS PLANTING PLAN

0 200

TETRA TECH

MIDAS GOLD

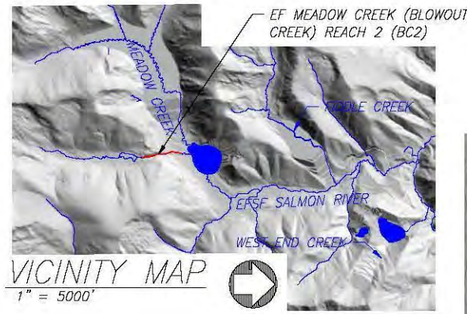
DRAFT

Date: Feb. 2019
Designed: LC, JHD
Drawn: JHD
Checked: LC
Approved: ––

Drawing Name
BC1 Wetland Planting Sheet

Drawing No.
BC1–4

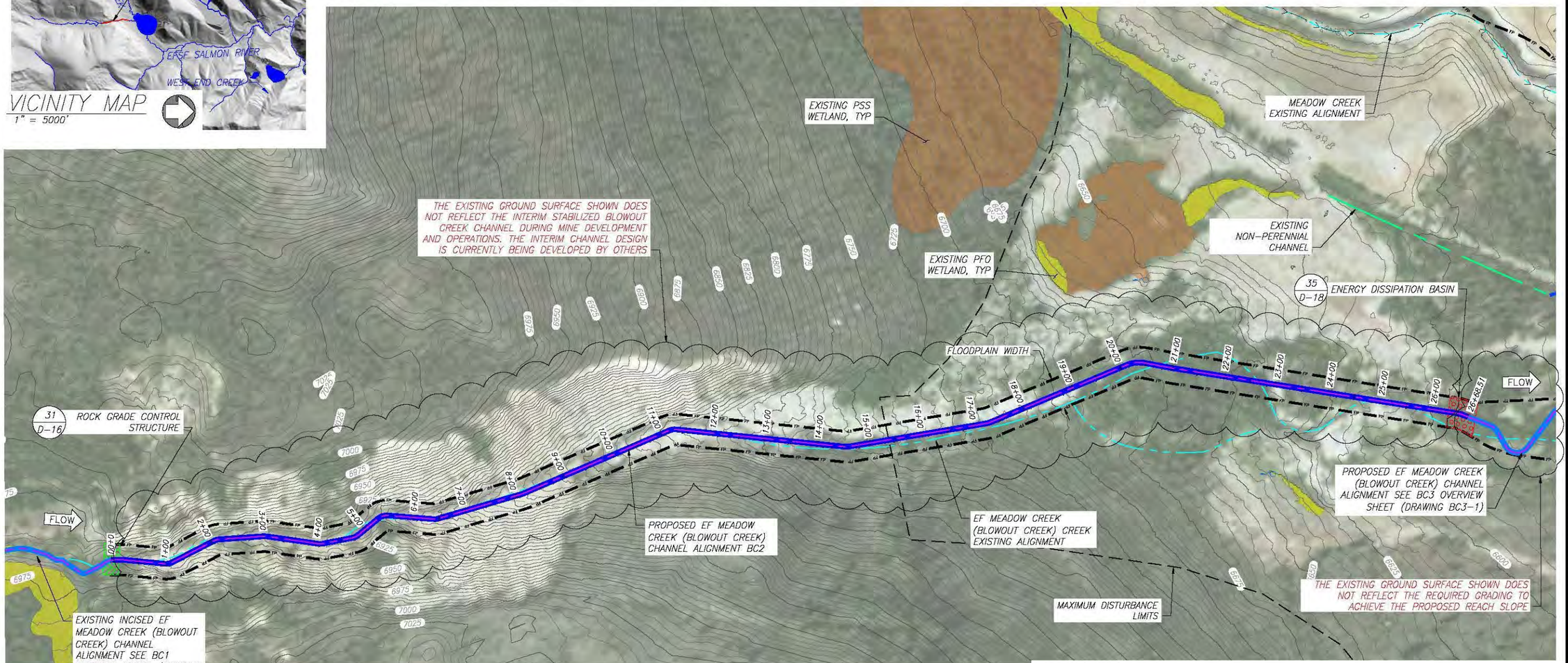
LOCATION: C:\USERS\JIM.DUSHIN\PICTURES\LARRY\CAD\BC1_WETLANDS POND PLANTING.DWG PLOT DATE: 2/14/2019



VICINITY MAP
1" = 5000'

BC2 PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
BC2	**2,650**	**2,670**	**1.0**	**14.15**	**14.04**

BC2 PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
BC2	**2,670**	**0**



NOTES AND ASSUMPTIONS:
1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE EF MEADOW CREEK (BLOWOUT CREEK) PRE-CLOSURE GROUND SURFACE, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. THE EXISTING EF MEADOW CREEK (BLOWOUT CREEK) CHANNEL MAY BE RELOCATED DURING MINE OPERATIONS TO ACCOMMODATE MINE FACILITIES.

EF MEADOW CREEK (BLOWOUT CREEK) REACH 2 - RESTORATION REACH SITE OVERVIEW PLAN

0 200 400 Feet

Applied Science & Engineering
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Boise, Idaho 83705

MIDAS GOLD

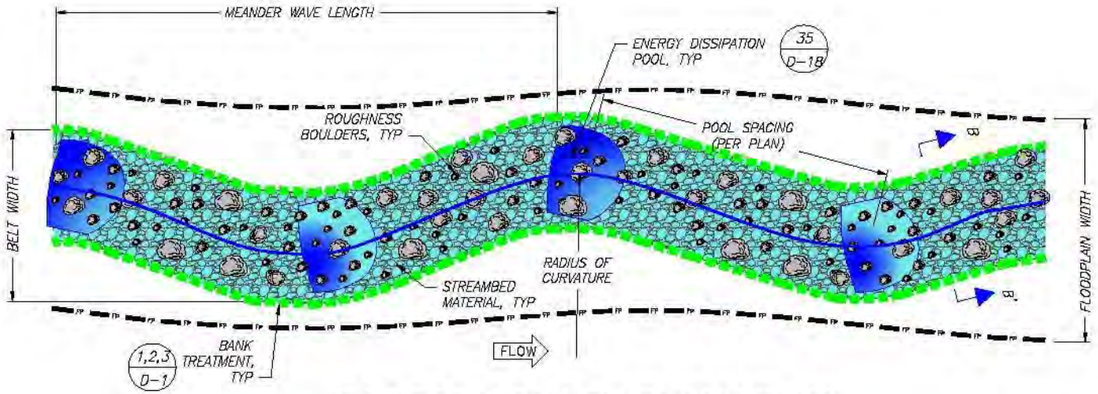
Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Blowout Creek - BC Restoration - Reach BC2
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: --

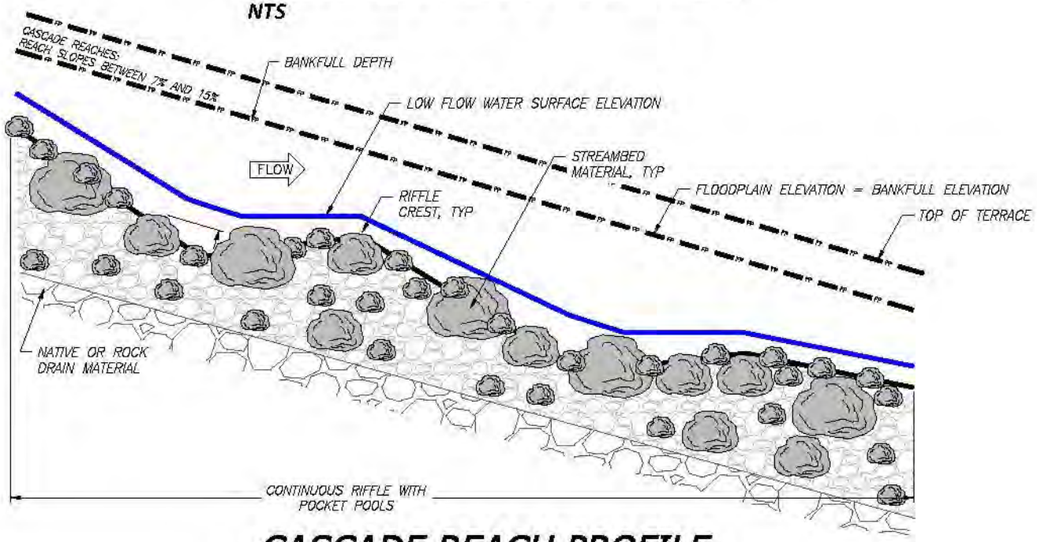
Drawing Name
BC2 Overview Sheet

Drawing No.
BC2-1



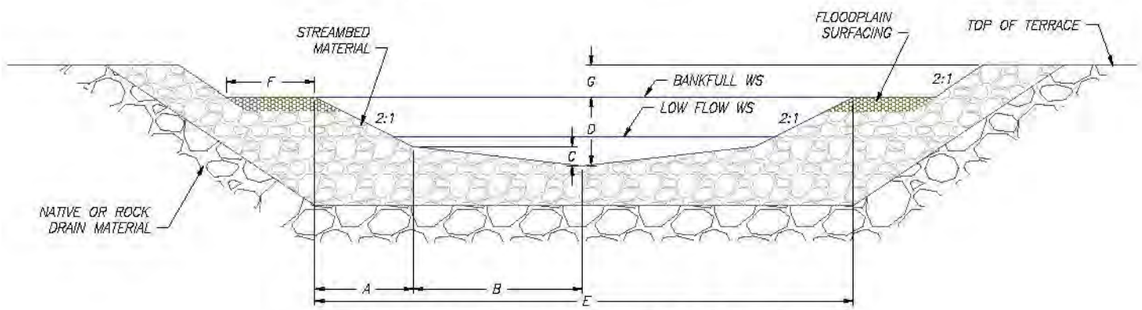
CASCADE REACH PLAN VIEW

NTS



CASCADE REACH PROFILE

NTS



RIFFLE SECTION B-B'

NTS

NOTES
1. CHANNEL AND FLOODPLAIN SHALL BE CONSTRUCTED TO THE DIMENSIONS IDENTIFIED IN THE CHANNEL DEFINITION TABLES AND AT THE LOCATIONS SHOWN IN INDIVIDUAL REACH OVERVIEW PLAN SHEETS.
2. CHANNEL SIZING FOR TYPICAL POOL AND RIFFLE CROSS SECTIONS IS BASED ON CHANNEL FORMING (BANKFULL) DESIGN FLOW. DETAILED TYPICAL SECTIONS FOR OTHER STREAM HABITATS WILL BE DEVELOPED IN A FUTURE DESIGN PHASE.
3. CASCADE REACHES ARE NOT EXPECTED TO HAVE BANK TREATMENT TYPES OR HABITAT STRUCTURES.
4. SEE SHEET D-18 FOR DISSIPATION POOL DETAILS.
5. LOCATION OF CASCADE REACH DISSIPATION POOLS ARE SHOWN IN INDIVIDUAL REACH OVERVIEW PLAN SHEETS. ASSOCIATED QUANTITIES ARE SUMMARIZED IN INDIVIDUAL REACH QUANTITY SHEETS.
6. SEE SHEETS D-1 AND D-20 FOR PLANTING AND SEEDING DETAILS AND PLANTING SCHEDULES.

BC2 – CASCADE REACH
PROPOSED CHANNEL DEFINITION TABLES

PLAN TABLE

REACH ID	BANKFULL FLOW (CFS)	BANKFULL WIDTH (FT)	WIDTH/ DEPTH RATIO	AVERAGE DEPTH AT BANKFULL (FT)	MEANDER WAVELENGTH (FT)	MEANDER BELT WIDTH (FT)	RADIUS OF CURVATURE (FT)	AVG POOL SPACING (FT)	FLOODPLAIN WIDTH (FT)
BC2	37	13	13	1.0	NA	NA	NA	NA	NA

PROFILE TABLE

REACH ID	RIFFLE LENGTH (FT)	POOL LENGTH (FT)	POOL ENTRANCE SLOPE (%)	POOL TAILOUT SLOPE (%)
BC2	NA	NA	NA	NA

NOTES
1. RIFFLE LENGTH INDICATED IN INDIVIDUAL REACH OVERVIEW PLAN SHEETS.
2. SEE DISSIPATION POOL DETAILS FOR POOL LENGTH AND ASSOCIATED DIMENSIONS.

MATERIALS TABLE

REACH ID	STREAMBED MATERIAL TYPE	STREAMBED MATERIAL AVG THICKNESS (FT)	RIFFLE MATERIAL TYPE	RIFFLE MATERIAL AVG THICKNESS (FT)	FLOODPLAIN MATERIAL TYPE	FLOODPLAIN MATERIAL AVG THICKNESS (FT)	FLOODPLAIN SURFACING TYPE	FLOODPLAIN SURFACING AVG THICKNESS (FT)

NOTES
1. MATERIALS TABLE TO BE DEVELOPED IN FUTURE DESIGN.
2. STREAMBED MATERIAL TYPES: S1 (D50 = XX"), S2 (D50 = XX"), S3 (D50 = XX").
3. RIFFLE MATERIAL TYPES: S1, S2, S3, R1 (D50 = XX"), R2 (D50 = XX").
4. FLOODPLAIN SURFACING MATERIAL TYPES: GROWTH MEDIA, ALGAE, HYDROMULCH, OR NONE.

SECTION TABLE

SECTION	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)	F (FT)	G (FT)
RIFFLE SECTION B - B'	1.6	2.5	0.3	1.3	13.2	5.0	2.0

NOTE
1. SEE DISSIPATION POOL DETAILS FOR POOL LENGTH AND ASSOCIATED DIMENSIONS.

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MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Blowout Creek - BC Restoration - Reach BC2
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: --

Drawing Name
BC2 Typical Plan and Profile

Drawing No.
BC2-2

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Low complexity for water management
Stormwater Management			
BMPs and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	Low complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	0	CY	
Floodplain Excavation (Cut)	0	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	0	CY	
Engineered Streambed Material [3]	7,664	CY	2670 LF of new channel; 1.7 FT average streambed thickness
Sorting and Stockpiling [3]	7,664	CY	
Rock Armoring/ Grade Control [3]	0	CY	
Ephemeral Swale Channel Material	0	CY	
General Fill	0	CY	
Filter Material	0	CY	
Topsoil/ Growth Media [3]	989	CY	12" thickness in Zone 3
Liner	0	SF	
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	0	LF	Assumes 0% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	0	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	0	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	0	LF	Assumes 0% of total length of bank treatment
Brushlayer Live Cuttings	0	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	0	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	0	LF	Assumes 0% of total length of bank treatment
Brushlayer Live Cuttings	0	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	0	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	0	EA	None
Riffle Material	0	CY	No. of riffles x 20' length x 10' width; 1ft thickness
Energy Dissipation Pool	1	EA	No. varies by reach
Boulders	65	EA	Based on bankfull width
Dissipation Pool Streambed Material	3	CY	Based on bankfull width, length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	0	EA	None
Foundation Logs	0	EA	0 per structure
Log with Rootwad	0	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	0	CY	2 CY per structure
Racking Material	0	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	38	EA	1 per 70 linear feet of new channel
Log with Rootwad	38	EA	1 per structure
Retaining Log	38	EA	1 per structure
Tight Radius Jam Structure	0	EA	None
Foundation Logs	0	EA	3 per structure
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	7 CY per structure
Racking Material	0	EA	7 per structure
Bend Jam Structure	0	EA	None
Foundation Logs	0	EA	2 per structure
Log with Rootwad	0	EA	3 per structure
Whole Tree	0	EA	1 per structure
Small Woody Debris	0	CY	13 CY per structure
Racking Material	0	EA	15 per structure
Sweeper Log Structure	0	EA	None
Whole Tree	0	EA	1 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Channel Spanning Jam	0	EA	None
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Wood Habitat Structure	0	EA	None
Log with Rootwad	0	EA	4 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Turning Log Structure	0	EA	None
Log with Rootwad	0	EA	4 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Boulders	0	EA	2 per structure
Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	10 per Alcove
Oxbow Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	25 per Alcove
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre, Intended for anually wet areas
Zone 2	593	EA	4840 plants per acre
Zone 3	469	EA	3825 plants per acre
Zone 4	1,159	EA	1891 plants per acre
Seeding			
Zone 2	0.12	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.12	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	0.61	AC	5' width each side of channel; 19.02 pure live seed/AC

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MIDAS GOLD

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Stream and Wetland Restoration Conceptual Design
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Valley County, Idaho

Draft

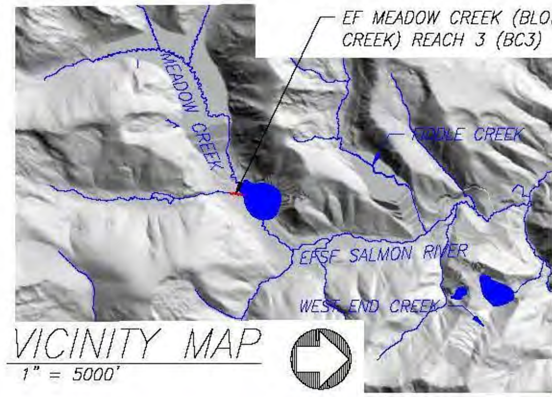
Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: —

Drawing Name
BC2 Quantities

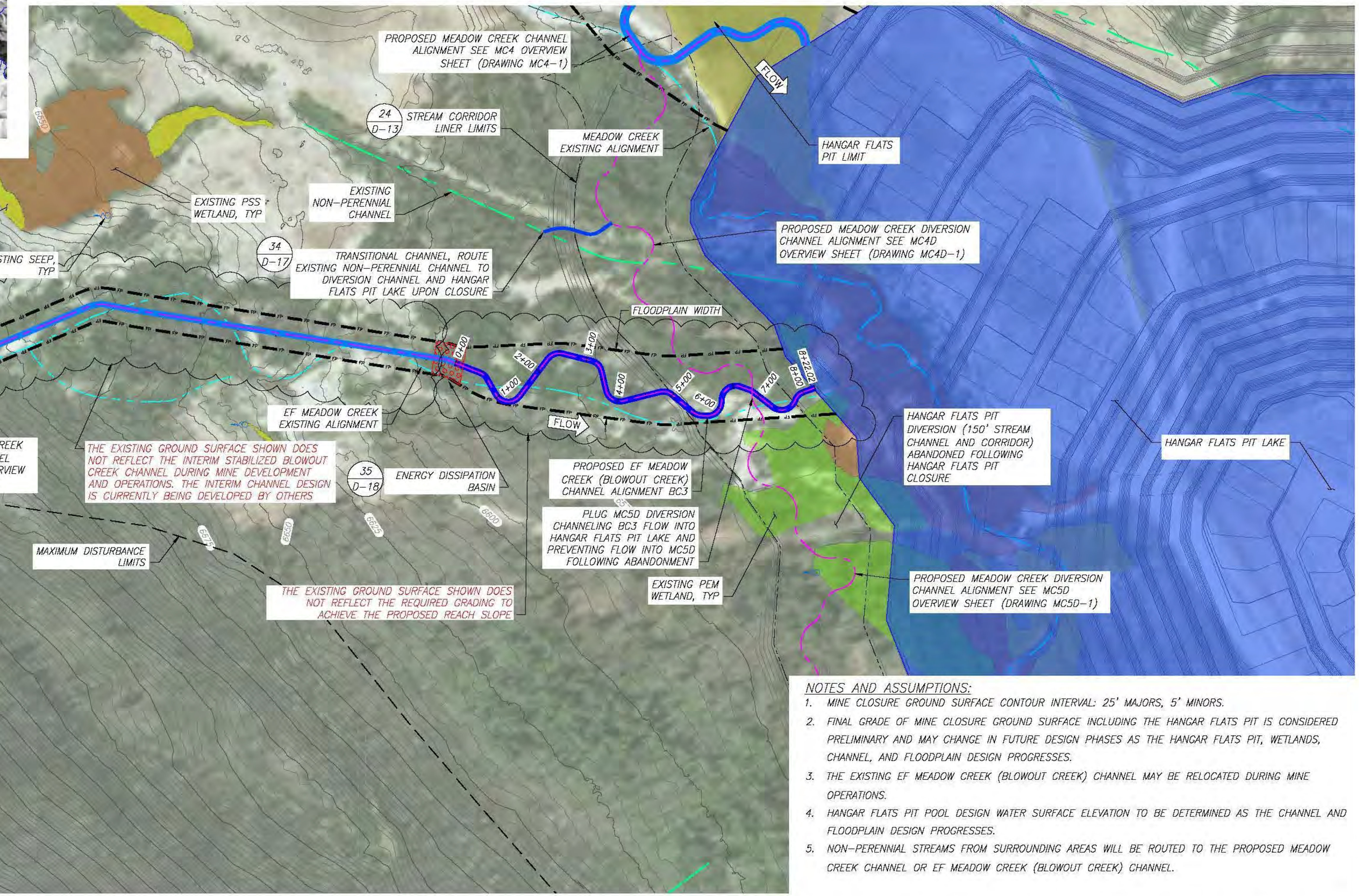
Drawing No.
BC2-3

BC3 PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
BC3	**645**	**822**	**1.3**	**6.20**	**4.87**

BC3 PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
BC3	**822**	**0**



VICINITY MAP
1" = 5000'



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE INCLUDING THE HANGAR FLATS PIT IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE HANGAR FLATS PIT, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. THE EXISTING EF MEADOW CREEK (BLOWOUT CREEK) CHANNEL MAY BE RELOCATED DURING MINE OPERATIONS.
4. HANGAR FLATS PIT POOL DESIGN WATER SURFACE ELEVATION TO BE DETERMINED AS THE CHANNEL AND FLOODPLAIN DESIGN PROGRESSES.
5. NON-PERENNIAL STREAMS FROM SURROUNDING AREAS WILL BE ROUTED TO THE PROPOSED MEADOW CREEK CHANNEL OR EF MEADOW CREEK (BLOWOUT CREEK) CHANNEL.

EF MEADOW CREEK (BLOWOUT CREEK) REACH 3 – RESTORATION REACH SITE OVERVIEW PLAN

0 200 400 Feet

Applied Science & Engineering
2449 S. Vista Ave. Suite B
Boise, Idaho 83705

MIDAS GOLD

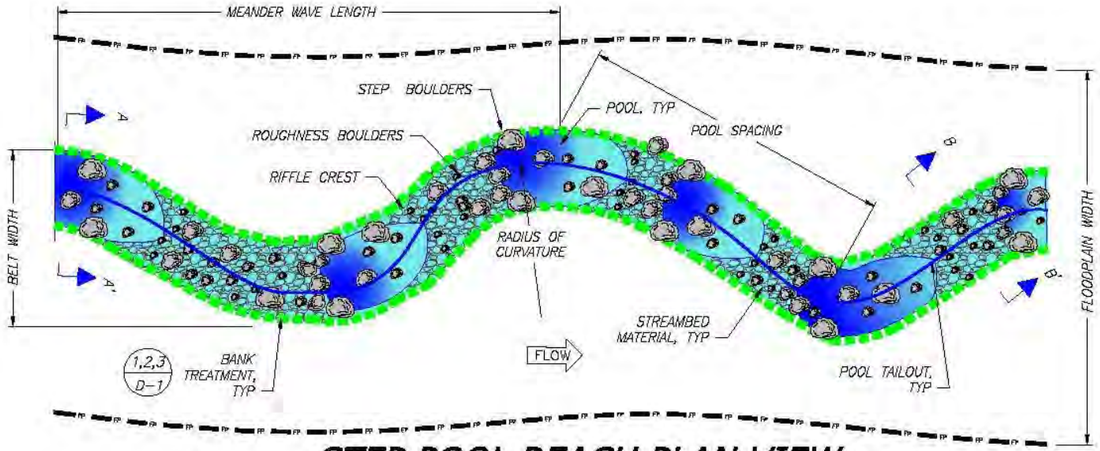
Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Blowout Creek - BC Restoration - Reach BC3
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: --

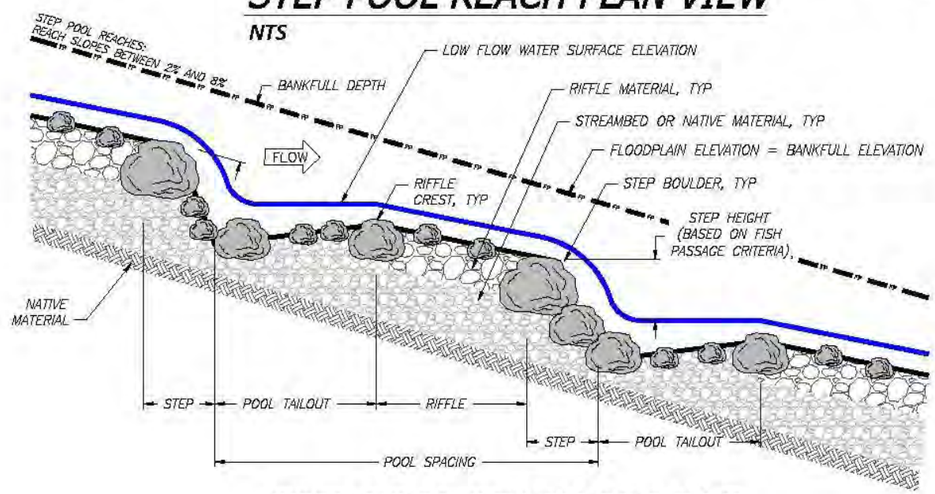
Drawing Name
BC3 Overview Sheet

Drawing No.
BC3-1



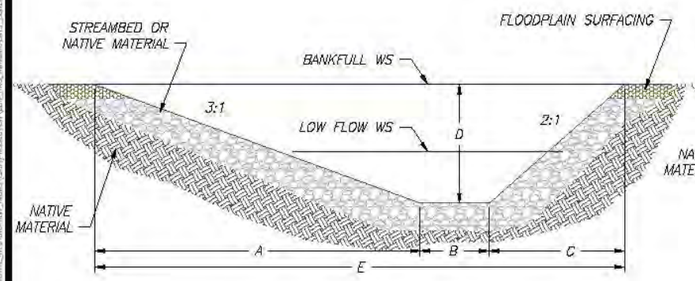
STEP POOL REACH PLAN VIEW

NTS



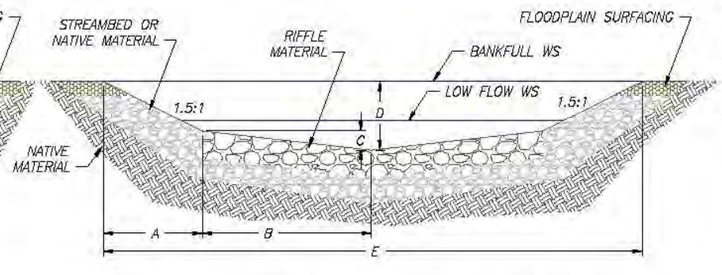
STEP POOL REACH PROFILE

NTS



POOL SECTION A-A'

NTS



RIFFLE SECTION B-B'

NTS

NOTES

1. CHANNEL AND FLOODPLAIN SHALL BE CONSTRUCTED TO THE DIMENSIONS IDENTIFIED IN THE CHANNEL DEFINITION TABLES AND AT THE LOCATIONS SHOWN IN INDIVIDUAL REACH OVERVIEW PLAN SHEETS.
2. CHANNEL SIZING FOR TYPICAL POOL AND RIFFLE CROSS SECTIONS IS BASED ON CHANNEL FORMING (BANKFULL) DESIGN FLOW. DETAILED TYPICAL SECTIONS FOR OTHER STREAM HABITATS WILL BE DEVELOPED IN A FUTURE DESIGN PHASE.
3. BANK TREATMENT TYPES ARE NOT DEPICTED IN THE TYPICAL POOL AND RIFFLE SECTIONS. SEE SHEETS D-1 AND D-2 FOR BANK TREATMENT DETAILS.
4. SEE SHEETS D-3 THROUGH D-10 FOR HABITAT STRUCTURE DETAILS.
5. HABITAT STRUCTURE SPACING AND ASSOCIATED QUANTITIES ARE SUMMARIZED IN INDIVIDUAL REACH QUANTITY SHEETS.
6. SEE SHEETS D-1 AND D-20 FOR PLANTING AND SEEDING DETAILS AND PLANTING SCHEDULES.
7. SEE SHEETS D-13 THROUGH D-14 FOR TYPICAL FLOODPLAIN CROSS SECTIONS.

BC3 – STEP POOL REACH
PROPOSED CHANNEL DEFINITION TABLES

PLAN TABLE

REACH ID	BANKFULL FLOW (CFS)	BANKFULL WIDTH (FT)	WIDTH/ DEPTH RATIO	AVERAGE DEPTH AT BANKFULL (FT)	MEANDER WAVELENGTH (FT)	MEANDER BELT WIDTH (FT)	RADIUS OF CURVATURE (FT)	AVG POOL SPACING (FT)	FLOODPLAIN WIDTH (FT)
BC3	**38**	**12**	**13**	**1.0**	**120 - 150**	**60 - 80**	**20 - 75**	**50 - 150**	**80 - 160**

PROFILE TABLE

REACH ID	RIFFLE LENGTH (FT)	POOL LENGTH (FT)	POOL ENTRANCE SLOPE (%)	POOL TAILOUT SLOPE (%)
BC3	**20 - 140**	**10 - 30**	**26 - 45**	**13 - 31**

MATERIALS TABLE

REACH ID	STREAMBED MATERIAL TYPE	STREAMBED MATERIAL AVG THICKNESS (FT)	RIFFLE MATERIAL TYPE	RIFFLE MATERIAL AVG THICKNESS (FT)	FLOODPLAIN MATERIAL TYPE	FLOODPLAIN MATERIAL AVG THICKNESS (FT)	FLOODPLAIN SURFACING TYPE	FLOODPLAIN SURFACING AVG THICKNESS (FT)
BC3								

NOTES

1. MATERIALS TABLE TO BE DEVELOPED IN FUTURE DESIGN.
2. STREAMBED MATERIAL TYPES: S1 (D50 = XX"), S2 (D50 = XX"), S3 (D50 = XX").
3. RIFFLE MATERIAL TYPES: S1, S2, S3, R1 (D50 = XX"), R2 (D50 = XX").
4. FLOODPLAIN SURFACING MATERIAL TYPES: GROWTH MEDIA, ALGAE, HYDROMULCH, OR NONE.

SECTIONS TABLE

SECTION	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)
POOL SECTION A - A'	**7.5**	**0.9**	**5.0**	**2.5**	**13.4**
RIFFLE SECTION B - B'	**1.4**	**4.7**	**0.5**	**1.4**	**12.2**

Applied Science & Engineering
2449 S. Vista Ave. Suite B
Boise, Idaho 83705

MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Blowout Creek - BC Restoration - Reach BC3
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: --

Drawing Name
BC3 Typical Plan and Profile

Drawing No.
BC3-2

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Low complexity for water management
Stormwater Management			
BMPs and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	Low complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	993	CY	Channel Length * Top Width * (Depth + D100)
Floodplain Excavation (Cut)	1,218	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	0	CY	
Engineered Streambed Material [3]	482	CY	822 LF of new channel; 1.3 FT average streambed thickness
Sorting and Stockpiling [3]	0	CY	
Rock Armoring/ Grade Control [3]	0	CY	
Ephemeral Swale Channel Material	0	CY	
General Fill	0	CY	
Filter Material	0	CY	
Topsoil/ Growth Media [3]	304	CY	12" thickness in Zone 3
Liner	0	SF	
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	329	LF	Assumes 20% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	658	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	658	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	219	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	1,315	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	0	LF	Assumes 0% of total length of bank treatment
Brushlayer Live Cuttings	0	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	0	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	658	LF	Assumes 40% of total length of bank treatment
Brushlayer Live Cuttings	1,315	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	92	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	27	EA	1 per step pool
Riffle Material	301	CY	No. of riffles x 6.5' length x 13' width; D100 thickness
Energy Dissipation Pool	0	EA	None
Boulders	0	EA	Based on bankfull width
Dissipation Pool Streambed Material	0	CY	Based on bankfull width, length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	3	EA	1 every 2 channel meander wave lengths
Foundation Logs	0	EA	0 per structure
Log with Rootwad	9	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	6	CY	2 CY per structure
Racking Material	6	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	18	EA	1 per 45 linear feet of new channel
Log with Rootwad	18	EA	1 per structure
Retaining Log	18	EA	1 per structure
Tight Radius Jam Structure	1	EA	1 every 8 channel meander wave lengths
Foundation Logs	5	EA	3 per structure
Log with Rootwad	5	EA	3 per structure
Small Woody Debris	10	CY	7 CY per structure
Racking Material	11	EA	7 per structure
Bend Jam Structure	1	EA	1 every 6 channel meander wave lengths
Foundation Logs	2	EA	2 per structure
Log with Rootwad	3	EA	3 per structure
Whole Tree	2	EA	1 per structure
Small Woody Debris	13	CY	13 CY per structure
Racking Material	15	EA	15 per structure
Sweeper Log Structure	3	EA	1 every 2 channel meander wave lengths
Whole Tree	3	EA	1 per structure
Small Woody Debris	9	CY	3 CY per structure
Racking Material	9	EA	3 per structure
Channel Spanning Jam	0	EA	None
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Wood Habitat Structure	2	EA	1 every 3 channel meander wave lengths
Log with Rootwad	8	EA	4 per structure
Small Woody Debris	6	CY	3 CY per structure
Racking Material	6	EA	3 per structure
Turning Log Structure	1	EA	1 every 6 channel meander wave lengths
Log with Rootwad	4	EA	4 per structure
Small Woody Debris	3	CY	3 CY per structure
Racking Material	3	EA	3 per structure
Boulders	2	EA	2 per structure
Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	10 per Alcove
Oxbow Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	25 per Alcove
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre; intended for anually wet areas
Zone 2	183	EA	4840 pants per acre
Zone 3	144	EA	3825 pants per acre
Zone 4	357	EA	1891 pants per acre
Seeding			
Zone 2	0.04	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.04	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	0.19	AC	5' width each side of channel; 19.02 pure live seed/AC

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MIDAS GOLD

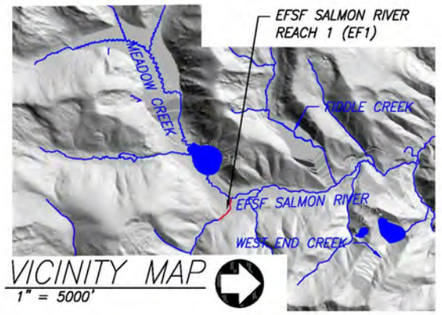
Stibnite Gold Project
Stream and Wetland Restoration Conceptual Design
Blowout Creek - BC Restoration - Reach BC3
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: ---

Drawing Name
BC3 Quantities

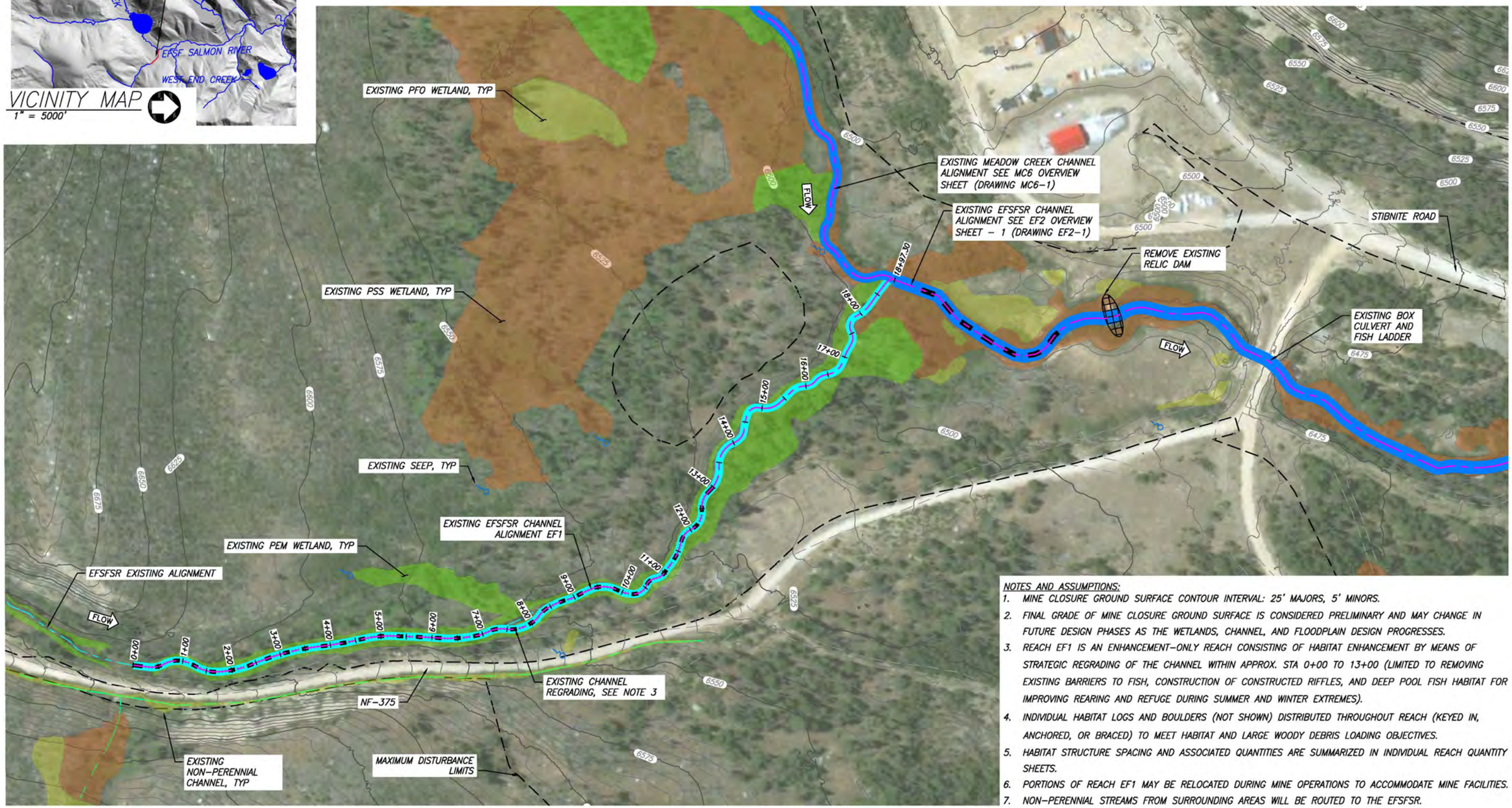
Drawing No.
BC3-3



VICINITY MAP
1" = 5000'

EF1 EXISTING CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
EF1	1,816	1,897	1.0	6.77	6.48

EF1 PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
EF1	1,897	0



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. REACH EF1 IS AN ENHANCEMENT-ONLY REACH CONSISTING OF HABITAT ENHANCEMENT BY MEANS OF STRATEGIC REGRADING OF THE CHANNEL WITHIN APPROX. STA 0+00 TO 13+00 (LIMITED TO REMOVING EXISTING BARRIERS TO FISH, CONSTRUCTION OF CONSTRUCTED RIFFLES, AND DEEP POOL FISH HABITAT FOR IMPROVING REARING AND REFUGE DURING SUMMER AND WINTER EXTREMES).
4. INDIVIDUAL HABITAT LOGS AND BOULDERS (NOT SHOWN) DISTRIBUTED THROUGHOUT REACH (KEYED IN, ANCHORED, OR BRACED) TO MEET HABITAT AND LARGE WOODY DEBRIS LOADING OBJECTIVES.
5. HABITAT STRUCTURE SPACING AND ASSOCIATED QUANTITIES ARE SUMMARIZED IN INDIVIDUAL REACH QUANTITY SHEETS.
6. PORTIONS OF REACH EF1 MAY BE RELOCATED DURING MINE OPERATIONS TO ACCOMMODATE MINE FACILITIES.
7. NON-PERENNIAL STREAMS FROM SURROUNDING AREAS WILL BE ROUTED TO THE EFSFSR.

0 200 400 Feet

EFSF SALMON RIVER REACH 1 - ENHANCEMENT REACH SITE OVERVIEW PLAN

Applied Science & Engineering
2449 S. Vista Ave. Suite B
Boise, Idaho 83705

MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
EFSFSR - Processing Facility - Reach EF1
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: --

Drawing Name
EF1 Overview Sheet

Drawing No.
EF1-1

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Medium complexity of diversion channel, or pump and pipe (cleaner)
Stormwater Management			
BMPs and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	Medium complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	1,701	CY	Assumes 67% of the upper 1300 lf gets reworked, 3-ft deep
Floodplain Excavation (Cut)	0	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	1,139	CY	Assumes 67% of the excavation gets replaced elsewhere on the channel
Engineered Streambed Material [3]	0	CY	
Sorting and Stockpiling [3]	0	CY	
Rock Armoring/ Grade Control [3]	0	CY	
Ephemeral Swale Channel Material [3]	0	CY	
General Fill	0	CY	
Filter Material	0	CY	
Topsoil/ Growth Media [3]	439	CY	12" thickness in Zone 3
Liner	0	SF	
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	0	LF	Assumes 0% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	0	EA	None
Live Stake	0	EA	Live Stakes 1 per 3 linear feet of bank treatment
Brushlayer Live Cuttings	0	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	0	LF	Assumes 0% of total length of bank treatment
Brushlayer Live Cuttings	0	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	0	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	0	LF	Assumes 0% of total length of bank treatment
Brushlayer Live Cuttings	0	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	0	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	0	EA	None
Riffle Material	0	CY	No. of riffles x 20' length x 10' width; 1ft thickness
Energy Dissipation Pool	0	EA	None
Boulders	0	EA	Based on bankfull width
Dissipation Pool Streambed Material	0	CY	Based on bankfull width, length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	7	EA	1 every 4 channel meander wave lengths
Foundation Logs	0	EA	0 per structure
Log with Rootwad	21	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	14	CY	2 CY per structure
Racking Material	14	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	0	EA	None
Log with Rootwad	0	EA	1 per structure
Retaining Log	0	EA	1 per structure
Tight Radius Jam Structure	5	EA	1 every 6 channel meander wave lengths
Foundation Logs	32	EA	3 per structure
Log with Rootwad	27	EA	3 per structure
Small Woody Debris	59	CY	7 CY per structure
Racking Material	64	EA	7 per structure
Bend Jam Structure	7	EA	1 every 4 channel meander wave lengths
Foundation Logs	14	EA	2 per structure
Log with Rootwad	21	EA	3 per structure
Whole Tree	14	EA	1 per structure
Small Woody Debris	89	CY	13 CY per structure
Racking Material	103	EA	15 per structure
Sweeper Log Structure	14	EA	1 every 2 channel meander wave lengths
Whole Tree	14	EA	1 per structure
Small Woody Debris	41	CY	3 CY per structure
Racking Material	41	EA	3 per structure
Channel Spanning Jam	0	EA	None
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Wood Habitat Structure	9	EA	1 every 3 channel meander wave lengths
Log with Rootwad	37	EA	4 per structure
Small Woody Debris	27	CY	3 CY per structure
Racking Material	27	EA	3 per structure
Turning Log Structure	5	EA	1 every 6 channel meander wave lengths
Log with Rootwad	18	EA	4 per structure
Small Woody Debris	14	CY	3 CY per structure
Racking Material	14	EA	3 per structure
Boulders	9	EA	2 per structure
Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	10 per Alcove
Oxbow Backwater Alcove	0	EA	None

Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre, intended for anually wet areas
Zone 2	88	EA	4840 plants per acre
Zone 3	69	EA	3825 plants per acre
Zone 4	515	EA	1891 plants per acre
Seeding			
Zone 2	0.02	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.02	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	0.27	AC	15' width each side of channel; 19.02 pure live seed/AC

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MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
EFSFSR - Processing Facility - Reach EF1
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: ---

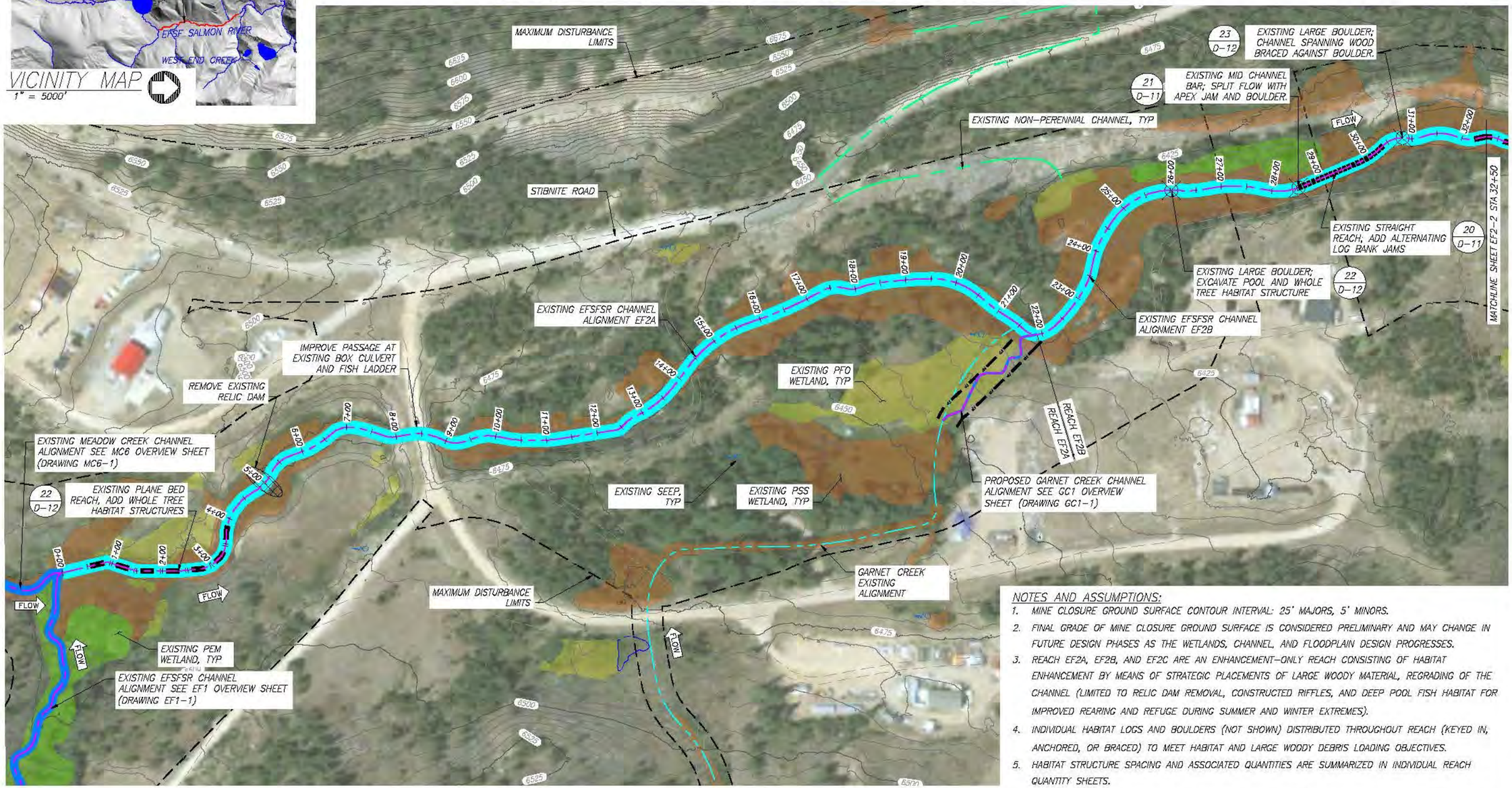
Drawing Name
EF1 Quantities

Drawing No.
EF1-2

VICINITY MAP
1" = 5000'

EF2 EXISTING CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
EF2A	2,020	2,190	1.1	3.32	3.06
EF2B	5,420	5,754	1.1	3.04	2.87
EF2C	1,094	1,174	1.1	6.95	6.47

EF2 PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
EF2	9,118	0



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. REACH EF2A, EF2B, AND EF2C ARE AN ENHANCEMENT-ONLY REACH CONSISTING OF HABITAT ENHANCEMENT BY MEANS OF STRATEGIC PLACEMENTS OF LARGE WOODY MATERIAL, REGRADING OF THE CHANNEL (LIMITED TO RELIC DAM REMOVAL, CONSTRUCTED RIFFLES, AND DEEP POOL FISH HABITAT FOR IMPROVED REARING AND REFUGE DURING SUMMER AND WINTER EXTREMES).
4. INDIVIDUAL HABITAT LOGS AND BOULDERS (NOT SHOWN) DISTRIBUTED THROUGHOUT REACH (KEYED IN, ANCHORED, OR BRACED) TO MEET HABITAT AND LARGE WOODY DEBRIS LOADING OBJECTIVES.
5. HABITAT STRUCTURE SPACING AND ASSOCIATED QUANTITIES ARE SUMMARIZED IN INDIVIDUAL REACH QUANTITY SHEETS.

EFSF SALMON RIVER REACH 2 – ENHANCEMENT REACH SITE OVERVIEW PLAN

0 200 400 Feet

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Boise, Idaho 83705

MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
EFSFSR - Yellow Pine Pit - Reach EF2
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JF, JY, MP
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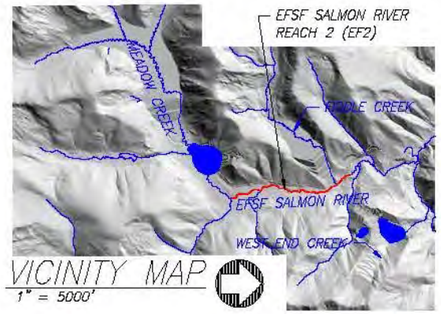
Checked: RR
Approved: ---

Drawing Name
EF2 Overview Sheet – 1

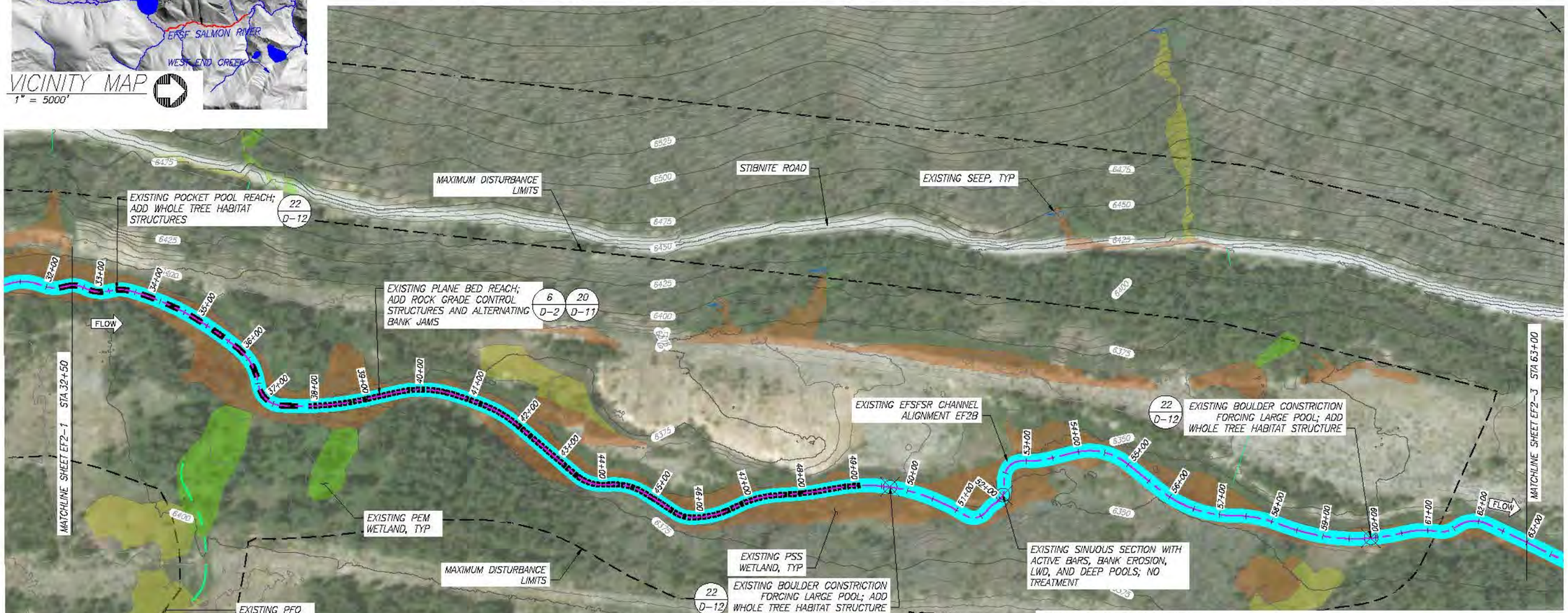
Drawing No.
EF2-1



VICINITY MAP
1" = 5000'

EF2 EXISTING CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
EF2A	2,020	2,190	1.1	3.32	3.06
EF2B	5,420	5,754	1.1	3.04	2.87
EF2C	1,094	1,174	1.1	6.95	6.47

EF2 PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
EF2	9,118	0



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. REACH EF2A, EF2B, AND EF2C ARE AN ENHANCEMENT-ONLY REACH CONSISTING OF HABITAT ENHANCEMENT BY MEANS OF STRATEGIC PLACEMENTS OF LARGE WOODY MATERIAL, REGRADING OF THE CHANNEL (LIMITED TO RELIC DAM REMOVAL, CONSTRUCTED RIFFLES, AND DEEP POOL FISH HABITAT FOR IMPROVED REARING AND REFUGE DURING SUMMER AND WINTER EXTREMES).
4. INDIVIDUAL HABITAT LOGS AND BOULDERS (NOT SHOWN) DISTRIBUTED THROUGHOUT REACH (KEYED IN, ANCHORED, OR BRACED) TO MEET HABITAT AND LARGE WOODY DEBRIS LOADING OBJECTIVES.
5. HABITAT STRUCTURE SPACING AND ASSOCIATED QUANTITIES ARE SUMMARIZED IN INDIVIDUAL REACH QUANTITY SHEETS.

EFSF SALMON RIVER REACH 2 – ENHANCEMENT REACH SITE OVERVIEW PLAN

0 200 400 Feet

Applied Science & Engineering
2449 S. Vista Ave. Suite B
Boise, Idaho 83705

MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
EFSFSR - Yellow Pine Pit - Reach EF2
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: --

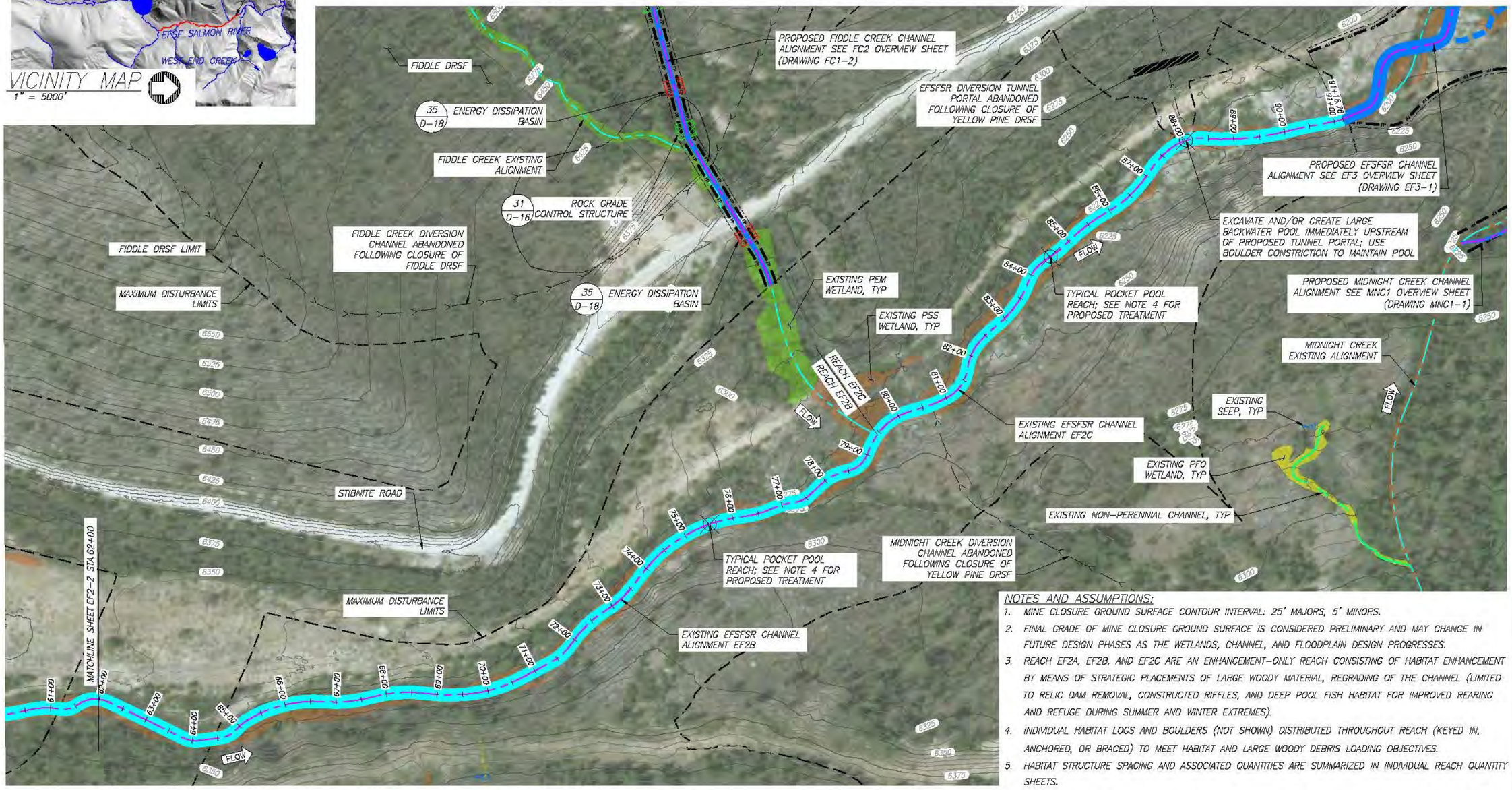
Drawing Name
EF2 Overview Sheet – 2

Drawing No.
EF2-2

VICINITY MAP
1" = 5000'

EF2 EXISTING CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
EF2A	2,020	2,190	1.1	3.32	3.06
EF2B	5,420	5,754	1.1	3.04	2.87
EF2C	1,094	1,174	1.1	6.95	6.47

EF2 PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
EF2	9,118	0



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. REACH EF2A, EF2B, AND EF2C ARE AN ENHANCEMENT-ONLY REACH CONSISTING OF HABITAT ENHANCEMENT BY MEANS OF STRATEGIC PLACEMENTS OF LARGE WOODY MATERIAL, REGRADING OF THE CHANNEL (LIMITED TO RELIC DAM REMOVAL, CONSTRUCTED RIFFLES, AND DEEP POOL FISH HABITAT FOR IMPROVED REARING AND REFUGE DURING SUMMER AND WINTER EXTREMES).
4. INDIVIDUAL HABITAT LOGS AND BOULDERS (NOT SHOWN) DISTRIBUTED THROUGHOUT REACH (KEYED IN, ANCHORED, OR BRACED) TO MEET HABITAT AND LARGE WOODY DEBRIS LOADING OBJECTIVES.
5. HABITAT STRUCTURE SPACING AND ASSOCIATED QUANTITIES ARE SUMMARIZED IN INDIVIDUAL REACH QUANTITY SHEETS.

EFSF SALMON RIVER REACH 2 – ENHANCEMENT REACH
SITE OVERVIEW PLAN

0 200 400 Feet

Applied Science & Engineering
2449 S. Vista Ave. Suite B
Boise, Idaho 83705

MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
EFSFSR - Yellow Pine Pit - Reach EF2
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: ---

Drawing Name
EF2 Overview Sheet – 3

Drawing No.
EF2-3

DETAILED QUANTITIES (EF2A, EF2B, EF2C)

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Medium complexity of diversion channel, or pump and pipe (cleaner)
Stormwater Management			
BMPs and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	Medium complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	5,066	CY	Assumes pool excavation every 4 bankfull widths
Floodplain Excavation (Cut)	0	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	3,394	CY	Assumes 67% of the excavation gets replaced elsewhere on the channel
Engineered Streambed Material [3]	0	CY	
Sorting and Stockpiling [3]	0	CY	Includes both Engineered Streambed Material and Rock Armoring
Rock Armoring/ Grade Control [3]	0	CY	
Ephemeral Swale Channel Material [3]	0	CY	
General Fill	0	CY	
Filter Material	0	CY	
Topsoil/ Growth Media [3]	3,166	CY	12" thickness in Zone 3
Liner	0	SF	
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	0	LF	Assumes 0% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	0	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	0	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	0	LF	Assumes 0% of total length of bank treatment
Brushlayer Live Cuttings	0	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	0	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	0	LF	Assumes 0% of total length of bank treatment
Brushlayer Live Cuttings	0	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	0	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	0	EA	None
Riffle Material	0	CY	No. of riffles x 20' length x 10' width; 1ft thickness
Energy Dissipation Pool	0	EA	None
Boulders	0	EA	Based on bankfull width
Dissipation Pool Streambed Material	0	CY	Based on bankfull width, length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	23	EA	1 every 4 channel meander wave lengths
Foundation Logs	0	EA	0 per structure
Log with Rootwad	68	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	45	CY	2 CY per structure
Racking Material	45	EA	2 per structure
Log Floodplain Roughness Structure	0	EA	None
Log with Rootwad	0	EA	1 per structure
Retaining Log	0	EA	1 per structure
Tight Radius Jam Structure	15	EA	1 every 6 channel meander wave lengths
Foundation Logs	106	EA	3 per structure
Log with Rootwad	91	EA	3 per structure
Small Woody Debris	196	CY	7 CY per structure
Racking Material	211	EA	7 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Bend Jam Structure	30	EA	1 every 3 channel meander wave lengths
Foundation Logs	60	EA	2 per structure
Log with Rootwad	91	EA	3 per structure
Whole Tree	60	EA	1 per structure
Small Woody Debris	393	CY	13 CY per structure
Racking Material	453	EA	15 per structure
Sweeper Log Structure	91	EA	1 every 1 channel meander wave lengths
Whole Tree	91	EA	1 per structure
Small Woody Debris	272	CY	3 CY per structure
Racking Material	272	EA	3 per structure
Channel Spanning Jam	4	EA	No. varies by reach
Log with Rootwad	12	EA	3 per structure
Small Woody Debris	12	CY	3 CY per structure
Racking Material	12	EA	3 per structure
Wood Habitat Structure	45	EA	1 every 2 channel meander wave lengths
Log with Rootwad	181	EA	4 per structure
Small Woody Debris	136	CY	3 CY per structure
Racking Material	136	EA	3 per structure
Turning Log Structure	23	EA	1 every 4 channel meander wave lengths
Log with Rootwad	91	EA	4 per structure
Small Woody Debris	68	CY	3 CY per structure
Racking Material	68	EA	3 per structure
Boulders	45	EA	2 per structure
Backwater Alcove	2	EA	No. varies by reach
Log with Rootwad	20	EA	10 per Alcove
Oxbow Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	25 per Alcove
Split Flow Side Channel	0	EA	None
Log with Rootwad	0	EA	4 per structure
Side Channel	0	EA	None
Log with Rootwad	0	EA	4 per structure
Alternating Bank Jam Structure	6	EA	No. varies by reach
Log with Rootwad	26	EA	4 per structure
Small Woody Debris	19	CY	3 CY per structure
Racking Material	19	EA	3 per structure
Existing Boulder Apex Jam	1	EA	No. varies by reach
Log with Rootwad	3	EA	3 per structure
Small Woody Debris	3	CY	3 CY per structure
Racking Material	3	EA	3 per structure
Whole Tree Habitat Structure	8	EA	No. varies by reach
Whole Tree	8	EA	1 per structure
Small Woody Debris	25	CY	3 CY per structure
Racking Material	25	EA	3 per structure
Existing boulder Channel Spanning Jam	1	EA	No. varies by reach
Log with Rootwad	3	EA	3 per structure
Small Woody Debris	3	CY	3 CY per structure
Racking Material	3	EA	3 per structure
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre, intended for anually wet areas
Zone 2	633	EA	4840 plants per acre
Zone 3	500	EA	3825 plants per acre
Zone 4	3,711	EA	1891 plants per acre
Seeding			
Zone 2	0.13	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.13	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	1.96	AC	15' width each side of channel; 19.02 pure live seed/AC

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MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
EFSFSR - Yellow Pine Pit - Reach EF2
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
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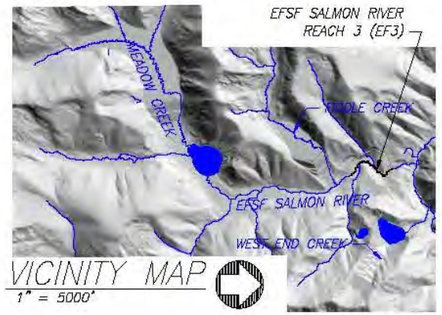
Drawing Name
EF2 Quantities

Drawing No.
EF2-4



VICINITY MAP
1" = 5000'

EF3 PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
EF3A	**1,055**	**1,243**	**1.2**	**4.43**	**3.76**
EF3B	**1,135**	**1,464**	**1.3**	**4.85**	**3.76**
EF3C	**1,560**	**1,899**	**1.2**	**4.58**	**3.76**

EF3 PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
EF3	**4,606**	**2,011**

NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE INCLUDING THE YELLOW PINE PIT BACKFILL GRADING IS CONSIDERED PRELIMINARY AND WILL CHANGE IN FUTURE DESIGN PHASES AS THE YELLOW PINE PIT BACKFILL, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. NON-PERENNIAL STREAMS FROM SURROUNDING AREAS WILL BE ROUTED TO THE PROPOSED EFSFSR, HENNESSY CREEK, OR MIDNIGHT CREEK CHANNELS.
4. PROPOSED WETLANDS ARE NOT SHOWN. SEE SHEET EF3-4 AND EF3-5 FOR WETLAND DESIGN.

EFSFSR DIVERSION TUNNEL ABANDONED FOLLOWING CLOSURE OF YELLOW PINE DRSF
35 D-18 ENERGY DISSIPATION BASIN
HENNESSY CREEK EXISTING ALIGNMENT
PROPOSED HENNESSY CREEK CHANNEL ALIGNMENT SEE HC1&2 OVERVIEW SHEET (DRAWING HC1&2-1)
STIBNITE ROAD
REACH EF3B
REACH EF3A
HIGH FLOW NON-PERENNIAL CHANNEL, TYP
33 D-17
PROPOSED EFSFSR CHANNEL ALIGNMENT EF3B
25 D-14 STREAM CORRIDOR LINER LIMIT
REACH EF3B
REACH EF3C
MAXIMUM DISTURBANCE LIMITS
FLOODPLAIN WIDTH
EXISTING PSS WETLAND, TYP
EXISTING EFSFSR CHANNEL ALIGNMENT SEE EF4 OVERVIEW SHEET (DRAWING EF4-1)
HIGH FLOW NON-PERENNIAL CHANNEL, TYP
33 D-17
EXISTING YELLOW PINE PIT LAKE
PROPOSED EFSFSR CHANNEL ALIGNMENT EF3C
PROPOSED EFSFSR CHANNEL ALIGNMENT EF3A
TIE PROPOSED FLOODPLAIN INTO EXISTING FLOODPLAIN
EFSFSR EXISTING ALIGNMENT
PROPOSED MIDNIGHT CREEK CHANNEL ALIGNMENT SEE MNC2 OVERVIEW SHEET (DRAWING MNC2-1)
EXISTING NON-PERENNIAL CHANNEL, TYP
TIE PROPOSED FLOODPLAIN INTO EXISTING FLOODPLAIN, TYP
ENERGY DISSIPATION BASIN 35 D-18
EXISTING SEEP, TYP
MIDNIGHT CREEK EXISTING ALIGNMENT
YELLOW PINE DRSF
EXISTING PFO WETLAND, TYP
EFSFSR EXISTING ALIGNMENT
PROPOSED EFSFSR CHANNEL ALIGNMENT SEE EF2 OVERVIEW SHEET - 3 (DRAWING EF2-3)
PROPOSED MIDNIGHT CREEK CHANNEL ALIGNMENT SEE MNC1 OVERVIEW SHEET (DRAWING MNC1-1)
FLOW

EAST FORK SOUTH FORK SALMON RIVER REACH 3 – RESTORATION REACH SITE OVERVIEW PLAN

0 200 400 Feet

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MIDAS GOLD

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Valley County, Idaho

Draft

Date: Feb. 2019
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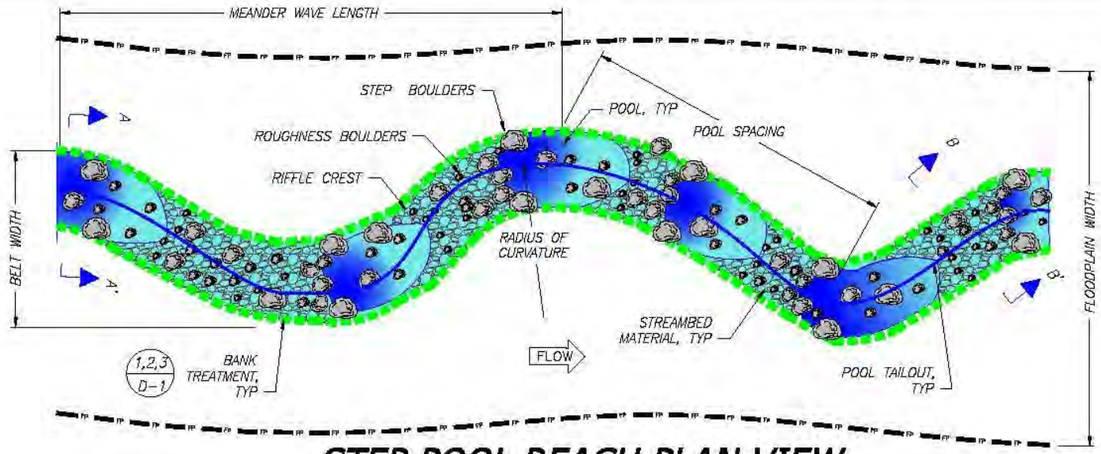
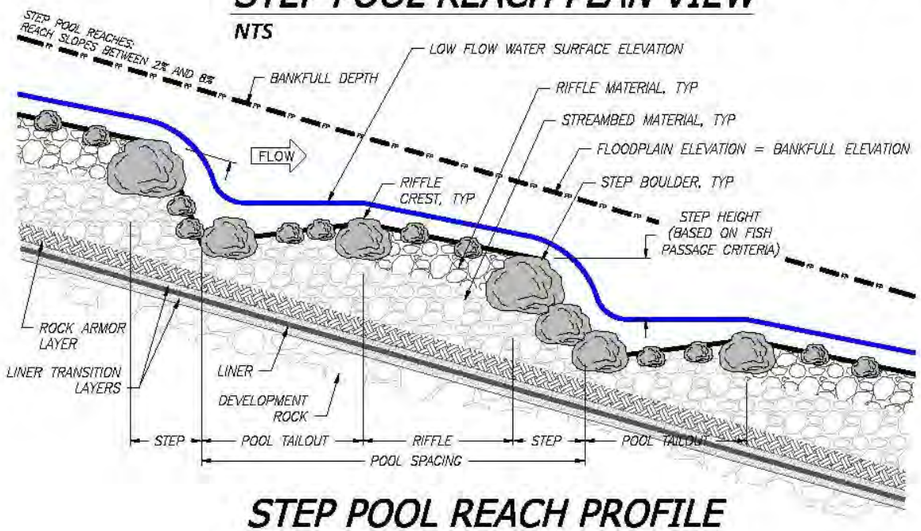
Drawing Name
EF3 Overview Sheet

Drawing No.
EF3-1



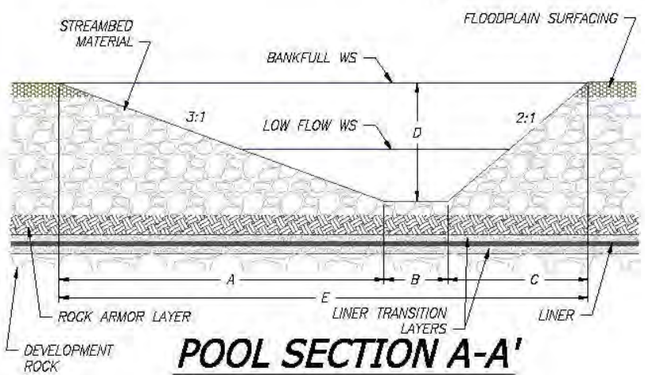
STEP POOL REACH PLAN VIEW

NTS



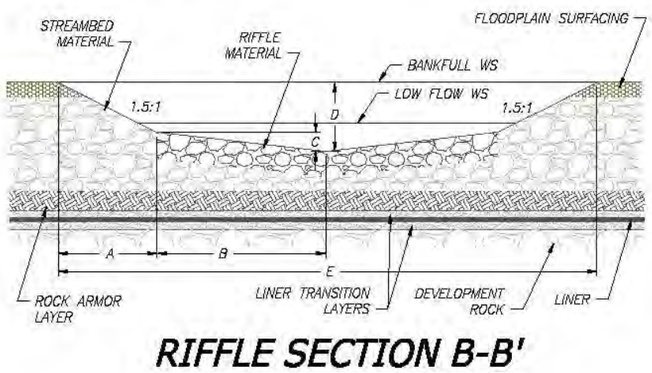
STEP POOL REACH PROFILE

NTS



POOL SECTION A-A'

NTS



RIFFLE SECTION B-B'

NTS

NOTES

1. CHANNEL AND FLOODPLAIN SHALL BE CONSTRUCTED TO THE DIMENSIONS IDENTIFIED IN THE CHANNEL DEFINITION TABLES AND AT THE LOCATIONS SHOWN IN INDIVIDUAL REACH OVERVIEW PLAN SHEETS.
2. CHANNEL SIZING FOR TYPICAL POOL AND RIFFLE CROSS SECTIONS IS BASED ON CHANNEL FORMING (BANKFULL) DESIGN FLOW. DETAILED TYPICAL SECTIONS FOR OTHER STREAM HABITATS WILL BE DEVELOPED IN A FUTURE DESIGN PHASE.
3. BANK TREATMENT TYPES ARE NOT DEPICTED IN THE TYPICAL POOL AND RIFFLE SECTIONS. SEE SHEETS D-1 AND D-2 FOR BANK TREATMENT DETAILS.
4. SEE SHEETS D-3 THROUGH D-10 FOR HABITAT STRUCTURE DETAILS.
5. HABITAT STRUCTURE SPACING AND ASSOCIATED QUANTITIES ARE SUMMARIZED IN INDIVIDUAL REACH QUANTITY SHEETS.
6. SEE SHEETS D-1 AND D-20 FOR PLANTING AND SEEDING DETAILS AND PLANTING SCHEDULES.
7. SEE SHEETS D-13 THROUGH D-14 FOR TYPICAL FLOODPLAIN CROSS SECTIONS.
2. ROCK ARMOR LAYER TO SPAN CHANNEL WIDTH, AS SHOWN, CONTINUOUSLY ALONG LONGITUDINAL PROFILE.
3. ROCK ARMOR LAYER TO SPAN VALLEY WIDTH, AS SHOWN, AT STRATEGIC LOCATIONS (TBD) ALONG LONGITUDINAL PROFILE.

EF3 – STEP POOL REACH
PROPOSED CHANNEL DEFINITION TABLES

PLAN TABLE

REACH ID	BANKFULL FLOW (CFS)	BANKFULL WIDTH (FT)	WIDTH/ DEPTH RATIO	AVERAGE DEPTH AT BANKFULL (FT)	MEANDER WAVELENGTH (FT)	MEANDER BELT WIDTH (FT)	RADIUS OF CURVATURE (FT)	AVG POOL SPACING (FT)	FLOODPLAIN WIDTH (FT)
EF3A	215	27	16	1.7	260 - 330	145 - 180	40 - 160	105 - 330	180 - 360
EF3B	227	28	17	1.7	270 - 350	155 - 180	40 - 165	110 - 350	180 - 360
EF3C	234	29	18	1.7	280 - 360	160 - 180	45 - 175	115 - 360	180 - 360

PROFILE TABLE

REACH ID	RIFFLE LENGTH (FT)	POOL LENGTH (FT)	POOL ENTRANCE SLOPE (%)	POOL TAILOUT SLOPE (%)
EF3A	45 - 305	25 - 65	20 - 45	10 - 24
EF3B	45 - 320	30 - 65	19 - 45	10 - 23
EF3C	45 - 335	30 - 70	18 - 44	9 - 22

MATERIALS TABLE

REACH ID	STREAMBED MATERIAL TYPE	STREAMBED MATERIAL AVG THICKNESS (FT)	RIFFLE MATERIAL TYPE	RIFFLE MATERIAL AVG THICKNESS (FT)	FLOODPLAIN MATERIAL TYPE	FLOODPLAIN MATERIAL AVG THICKNESS (FT)	FLOODPLAIN SURFACING TYPE	FLOODPLAIN SURFACING AVG THICKNESS (FT)
EF3A								
EF3B								
EF3C								

NOTES

1. MATERIALS TABLE TO BE DEVELOPED IN FUTURE DESIGN.
2. STREAMBED MATERIAL TYPES: S1 (D50 = XX"), S2 (D50 = XX"), S3 (D50 = XX").
3. RIFFLE MATERIAL TYPES: S1, S2, S3, R1 (D50 = XX"), R2 (D50 = XX").
4. FLOODPLAIN SURFACING MATERIAL TYPES: GROWTH MEDIA, ALGAE, HYDROMULCH, OR NONE.

SECTIONS TABLE

REACH ID	SECTION	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)
EF3A	POOL SECTION A - A'	12.8	8.0	8.5	4.3	29.3
EF3B		12.8	9.4	8.5	4.3	30.7
EF3C		12.8	10.7	8.5	4.3	31.9
EF3A	RIFFLE SECTION B - B'	2.2	11.1	0.7	2.2	26.6
EF3B		2.1	11.9	0.8	2.2	27.9
EF3C		2.0	12.6	0.8	2.2	29.0

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Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
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Approved: --

Drawing Name
EF3 Typical Plan and Profile

Drawing No.
EF3-2

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Low complexity of diversion channel, or pump and pipe (cleaner)
Stormwater Management			
BMPs and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	Low complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	10,804	CY	Channel Length * Top Width * (Depth + D100)
Floodplain Excavation (Cut)	0	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	0	CY	
Engineered Streambed Material [3]	27,892	CY	
Sorting and Stockpiling [3]	66,230	CY	Includes both Engineered Streambed Material and Rock Armoring
Rock Armoring/ Grade Control [3]	38,338	CY	
Ephemeral Swale Channel Material [3]	428	CY	2011 LF of new channel;0.5 FT gravel thickness; 5.75' SF XS
General Fill	32,043	CY	
Filter Material	35,389	CY	
Topsoil/ Growth Media [3]	1,706	CY	12" thickness in Zone 3
Liner	318,504	SF	Includes all material and labor
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	0	LF	Assumes 0% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	0	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	0	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	5,527	LF	Assumes 60% of total length of bank treatment
Brushlayer Live Cuttings	11,054	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	1,548	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	1,842	LF	Assumes 20% of total length of bank treatment
Brushlayer Live Cuttings	3,685	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	258	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	0	EA	None
Riffle Material	0	CY	No. of riffles x 20' length x 10' width; 1ft thickness
Energy Dissipation Pool	0	EA	None
Boulders	0	EA	Based on bankfull width
Dissipation Pool Streambed Material	0	CY	Based on bankfull width; length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	13	EA	1 every 2 channel meander wave lengths
Foundation Logs	0	EA	0 per structure
Log with Rootwad	39	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	26	CY	2 CY per structure
Racking Material	26	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	184	EA	1 per 25 linear feet of new channel
Log with Rootwad	184	EA	1 per structure
Retaining Log	184	EA	1 per structure
Tight Radius Jam Structure	4	EA	1 every 6 channel meander wave lengths
Foundation Logs	31	EA	3 per structure
Log with Rootwad	26	EA	3 per structure
Small Woody Debris	57	CY	7 CY per structure
Racking Material	61	EA	7 per structure
Bend Jam Structure	9	EA	1 every 3 channel meander wave lengths
Foundation Logs	18	EA	2 per structure
Log with Rootwad	26	EA	3 per structure
Whole Tree	18	EA	1 per structure
Small Woody Debris	114	CY	13 CY per structure
Racking Material	132	EA	15 per structure
Sweeper Log Structure	13	EA	1 every 2 channel meander wave lengths
Whole Tree	13	EA	1 per structure
Small Woody Debris	39	CY	3 CY per structure
Racking Material	39	EA	3 per structure
Channel Spanning Jam	4	EA	No. varies by reach
Log with Rootwad	12	EA	3 per structure
Small Woody Debris	12	CY	3 CY per structure
Racking Material	12	EA	3 per structure
Wood Habitat Structure	9	EA	1 every 3 channel meander wave lengths
Log with Rootwad	35	EA	4 per structure
Small Woody Debris	26	CY	3 CY per structure
Racking Material	26	EA	3 per structure
Turning Log Structure	4	EA	1 every 6 channel meander wave lengths
Log with Rootwad	18	EA	4 per structure
Small Woody Debris	13	CY	3 CY per structure
Racking Material	13	EA	3 per structure
Boulders	9	EA	2 per structure
Backwater Alcove	2	EA	No. varies by reach
Log with Rootwad	20	EA	10 per Alcove
Oxbow Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	25 per Alcove
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre, intended for anually wet areas
Zone 2	1,024	EA	4840 plants per acre
Zone 3	809	EA	3825 plants per acre
Zone 4	2,000	EA	1891 plants per acre
Seeding			
Zone 2	0.21	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.21	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	1.06	AC	5' width each side of channel; 19.02 pure live seed/AC

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MIDAS GOLD

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Valley County, Idaho

Draft

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Designed: JF, JY, MP
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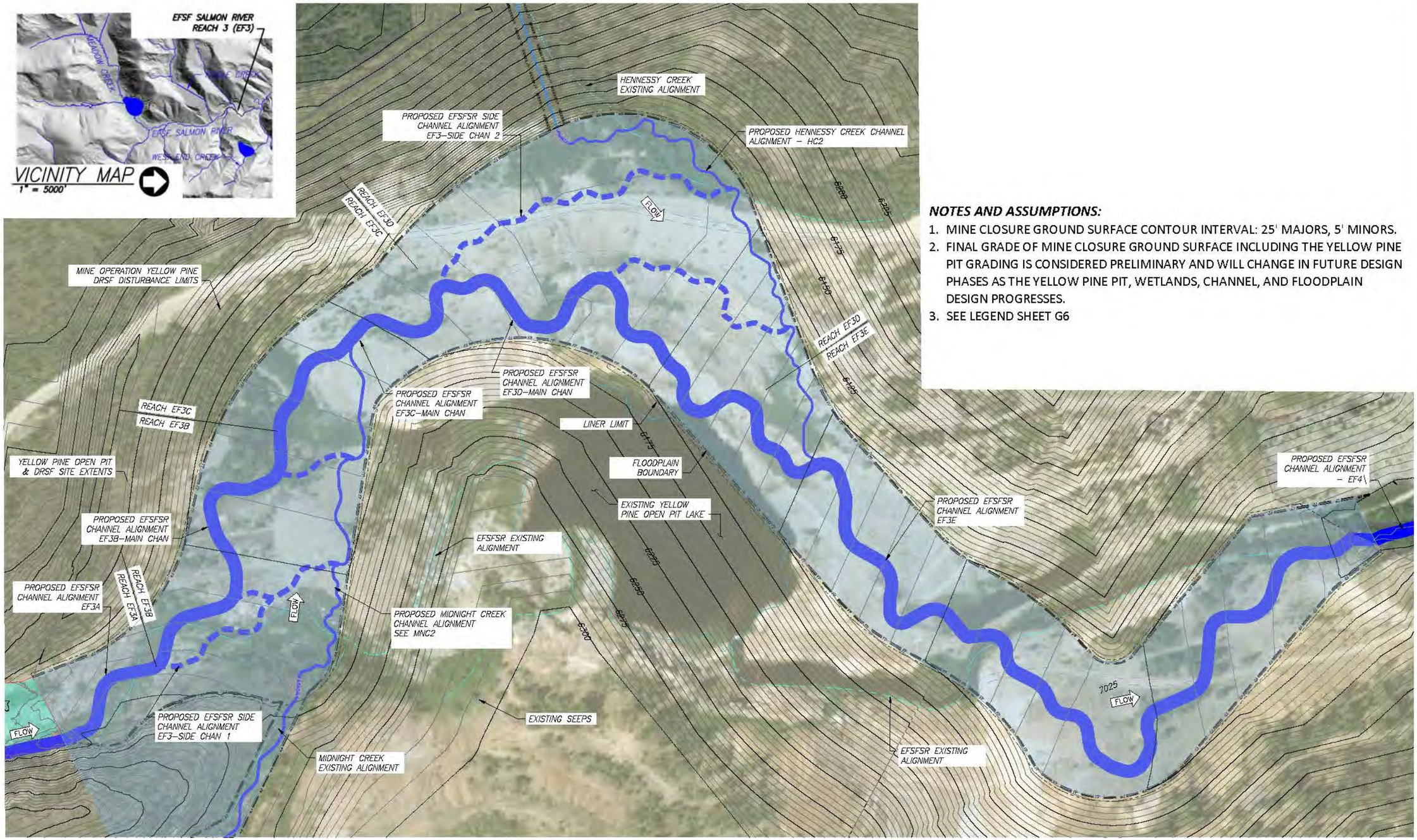
Drawing Name
EF3 Quantities

Drawing No.
EF3-3



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE INCLUDING THE YELLOW PINE PIT GRADING IS CONSIDERED PRELIMINARY AND WILL CHANGE IN FUTURE DESIGN PHASES AS THE YELLOW PINE PIT, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. SEE LEGEND SHEET G6

EAST FORK SOUTH FORK SALMON RIVER - REACH 3
WETLANDS OVERVIEW PLAN

0 200

TETRA TECH

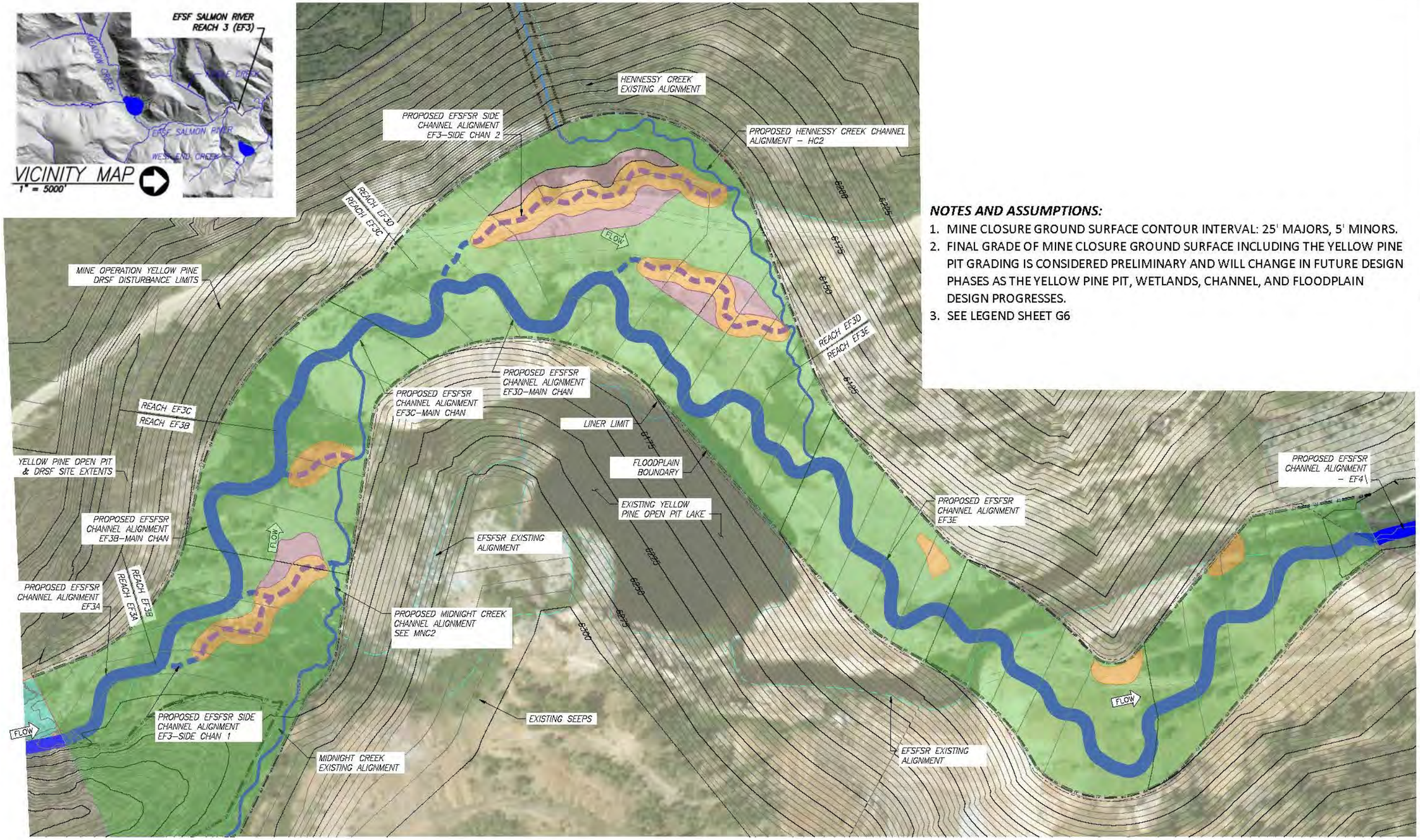
MIDAS GOLD

Draft

Date: Feb. 2019
Designed: LC, JHD
Drawn: JHD
Checked: LC
Approved: --

Drawing Name
EF3 Wetland Sheet

Drawing No.
EF3–4



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE INCLUDING THE YELLOW PINE PIT GRADING IS CONSIDERED PRELIMINARY AND WILL CHANGE IN FUTURE DESIGN PHASES AS THE YELLOW PINE PIT, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. SEE LEGEND SHEET G6

EAST FORK SOUTH FORK SALMON RIVER - REACH 3
WETLANDS PLANTING PLAN

0 200

TETRA TECH

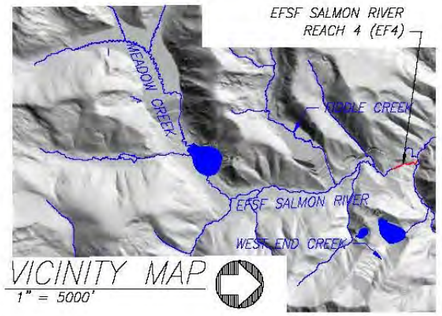
MIDAS GOLD

Draft

Date: Feb. 2019
Designed: LC, JHD
Drawn: JHD
Checked: LC
Approved: --

Drawing Name
EF3 Wetland Planting Sheet

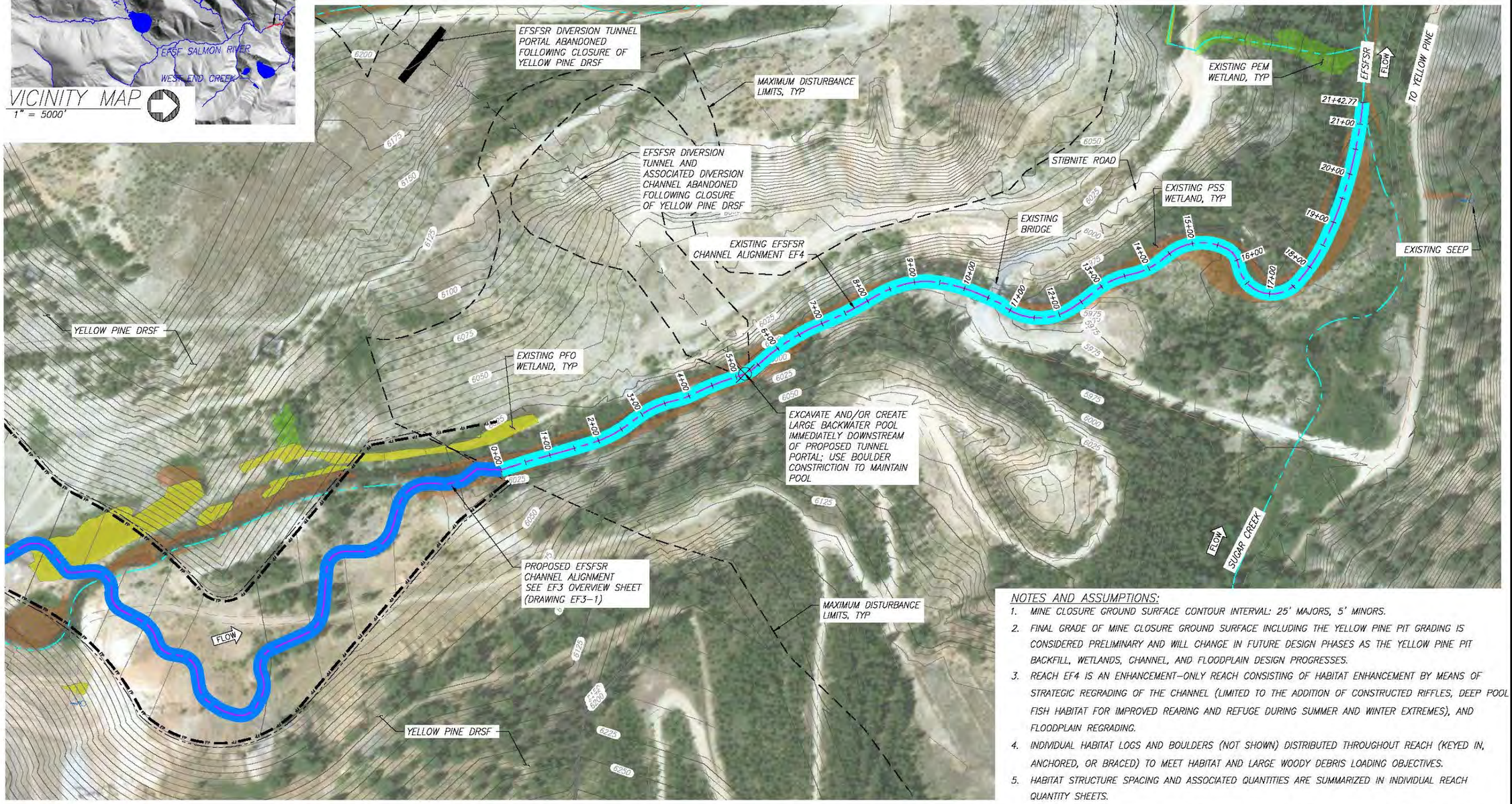
Drawing No.
EF3–5



VICINITY MAP
1" = 5000'

EF4 EXISTING CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
EF4	**2,030**	**2,143**	**1.1**	**4.29**	**4.06**

EF4 PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
EF4	**2,143**	**0**



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE INCLUDING THE YELLOW PINE PIT GRADING IS CONSIDERED PRELIMINARY AND WILL CHANGE IN FUTURE DESIGN PHASES AS THE YELLOW PINE PIT BACKFILL, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. REACH EF4 IS AN ENHANCEMENT-ONLY REACH CONSISTING OF HABITAT ENHANCEMENT BY MEANS OF STRATEGIC REGRADING OF THE CHANNEL (LIMITED TO THE ADDITION OF CONSTRUCTED RIFFLES, DEEP POOL FISH HABITAT FOR IMPROVED REARING AND REFUGE DURING SUMMER AND WINTER EXTREMES), AND FLOODPLAIN REGRADING.
4. INDIVIDUAL HABITAT LOGS AND BOULDERS (NOT SHOWN) DISTRIBUTED THROUGHOUT REACH (KEYED IN, ANCHORED, OR BRACED) TO MEET HABITAT AND LARGE WOODY DEBRIS LOADING OBJECTIVES.
5. HABITAT STRUCTURE SPACING AND ASSOCIATED QUANTITIES ARE SUMMARIZED IN INDIVIDUAL REACH QUANTITY SHEETS.

0 200 400 Feet

EFSF SALMON RIVER REACH 4 – ENHANCEMENT REACH SITE OVERVIEW PLAN

Applied Science & Engineering
2449 S. Vista Ave. Suite B
Boise, Idaho 83705

MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
EFSFSR - Yellow Pine Pit - Reach EF4
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: --

Drawing Name
EF4 Overview Sheet

Drawing No.
EF4-1

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	High complexity of diversion channel, or pump and pipe (cleaner)
Stormwater Management			
BMP's and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	Low complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	1,191	CY	Assumes pool excavation every 4 bankfull widths
Floodplain Excavation (Cut)	0	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	798	CY	
Engineered Streambed Material [3]	0	CY	
Sorting and Stockpiling [3]	0	CY	Includes both Engineered Streambed Material and Rock Armoring
Rock Armoring/ Grade Control [3]	0	CY	
Ephemeral Swale Channel Material [3]	0	CY	
General Fill	0	CY	
Filter Material	0	CY	
Topsoil/ Growth Media [3]	744	CY	12" thickness in Zone 3
Liner	0	SF	
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	0	LF	Assumes 0% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	0	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	0	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	0	LF	Assumes 0% of total length of bank treatment
Brushlayer Live Cuttings	0	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	0	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	0	LF	Assumes 0% of total length of bank treatment
Brushlayer Live Cuttings	0	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	0	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	0	EA	None
Riffle Material	0	CY	No. of riffles x 20' length x 10' width; 1ft thickness
Energy Dissipation Pool	0	EA	None
Boulders	0	EA	Based on bankfull width
Dissipation Pool Streambed Material	0	CY	Based on bankfull width, length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	5	EA	1 every 4 channel meander wave lengths
Foundation Logs	0	EA	0 per structure
Log with Rootwad	15	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	10	CY	2 CY per structure
Racking Material	10	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	0	EA	None
Log with Rootwad	0	EA	1 per structure
Retaining Log	0	EA	1 per structure
Tight Radius Jam Structure	5	EA	1 every 4 channel meander wave lengths
Foundation Logs	34	EA	3 per structure
Log with Rootwad	29	EA	3 per structure
Small Woody Debris	63	CY	7 CY per structure
Racking Material	68	EA	7 per structure
Bend Jam Structure	10	EA	1 every 2 channel meander wave lengths
Foundation Logs	19	EA	2 per structure
Log with Rootwad	29	EA	3 per structure
Whole Tree	19	EA	1 per structure
Small Woody Debris	126	CY	13 CY per structure
Racking Material	145	EA	15 per structure
Sweeper Log Structure	19	EA	1 every 1 channel meander wave lengths
Whole Tree	19	EA	1 per structure
Small Woody Debris	58	CY	3 CY per structure
Racking Material	58	EA	3 per structure
Channel Spanning Jam	0	EA	None
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Wood Habitat Structure	5	EA	1 every 4 channel meander wave lengths
Log with Rootwad	19	EA	4 per structure
Small Woody Debris	15	CY	3 CY per structure
Racking Material	15	EA	3 per structure
Turning Log Structure	5	EA	1 every 4 channel meander wave lengths
Log with Rootwad	19	EA	4 per structure
Small Woody Debris	15	CY	3 CY per structure
Racking Material	15	EA	3 per structure
Boulders	10	EA	2 per structure
Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	10 per Alcove
Oxbow Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	25 per Alcove

Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre; intended for anually wet areas
Zone 2	149	EA	4840 plants per acre
Zone 3	118	EA	3825 plants per acre
Zone 4	872	EA	1891 plants per acre
Seeding			
Zone 2	0.03	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.03	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	0.46	AC	15' width each side of channel; 19.02 pure live seed/AC

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MIDAS GOLD

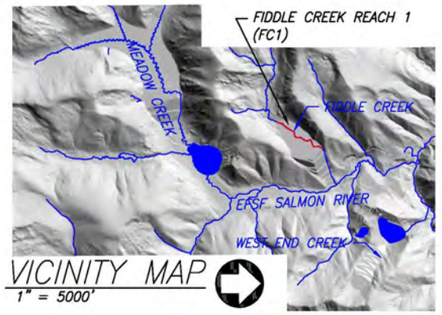
Stibnite Gold Project
Stream and Wetland Restoration Concept Design
EFSFSR - Yellow Pine Pit - Reach EF4
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: ---

Drawing Name
EF4 Quantities

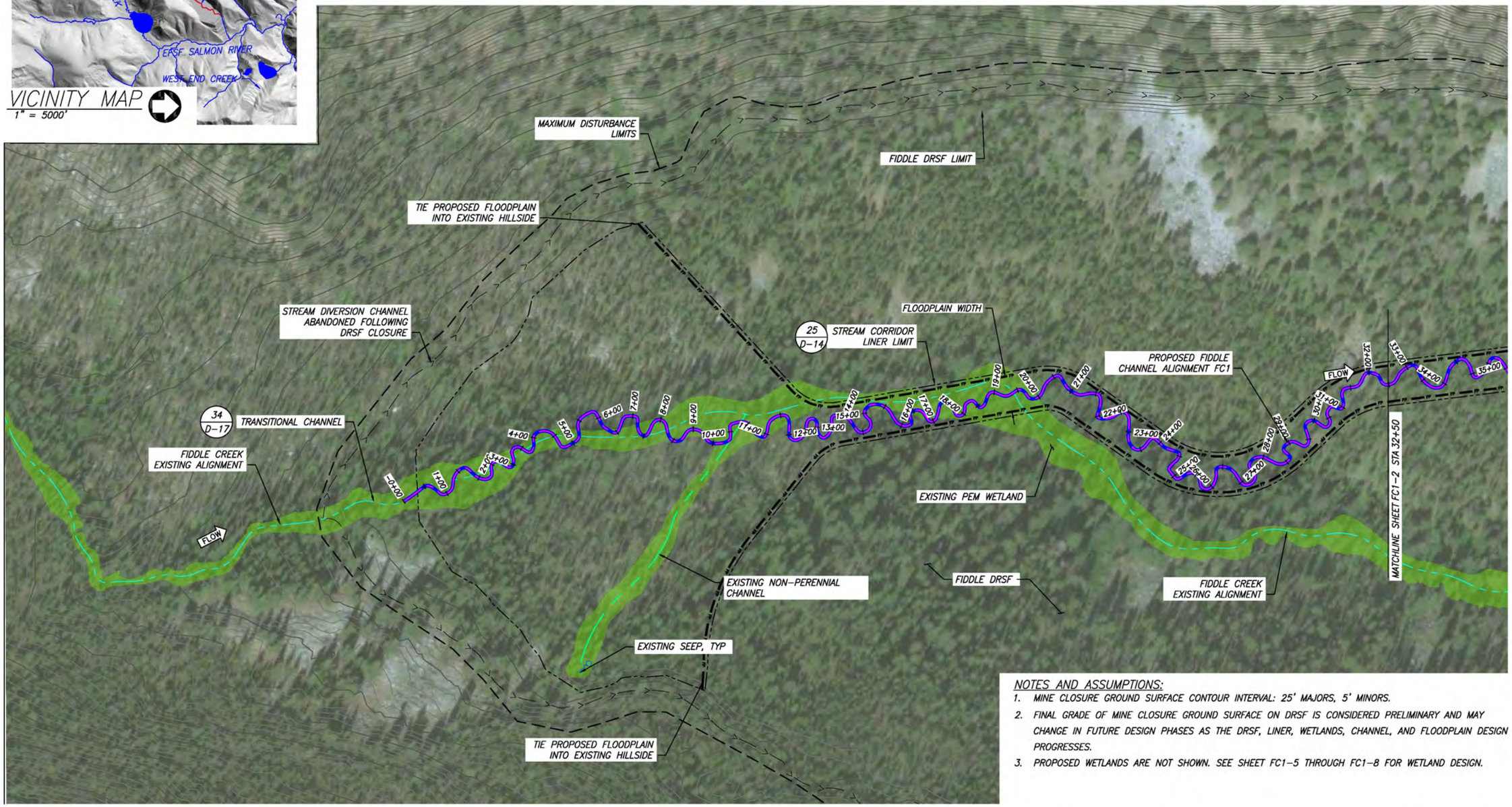
Drawing No.
EF4-2



VICINITY MAP
1" = 5000'

FC1 PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
FC1	3,822	5,860	1.5	1.00	0.65

FC1 PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
FC1	5,860	0



NOTES AND ASSUMPTIONS:
1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON DRSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE DRSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. PROPOSED WETLANDS ARE NOT SHOWN. SEE SHEET FC1-5 THROUGH FC1-8 FOR WETLAND DESIGN.

FIDDLE CREEK REACH 1 – RESTORATION REACH SITE OVERVIEW PLAN

0 200 400 Feet

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2449 S. Vista Ave. Suite B
Boise, Idaho 83705

MIDAS GOLD

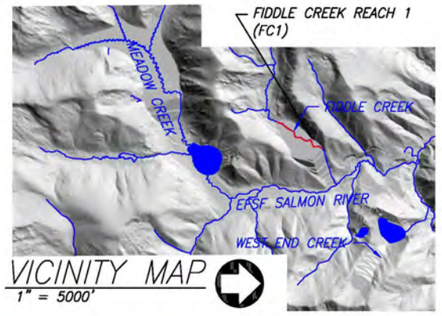
Stibnite Gold Project
Stream and Wetland Restoration Conceptual Design
Fiddle Creek - Fiddle DRSF - Reach FC1
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: ---

Drawing Name
FC1 Overview Sheet – 1

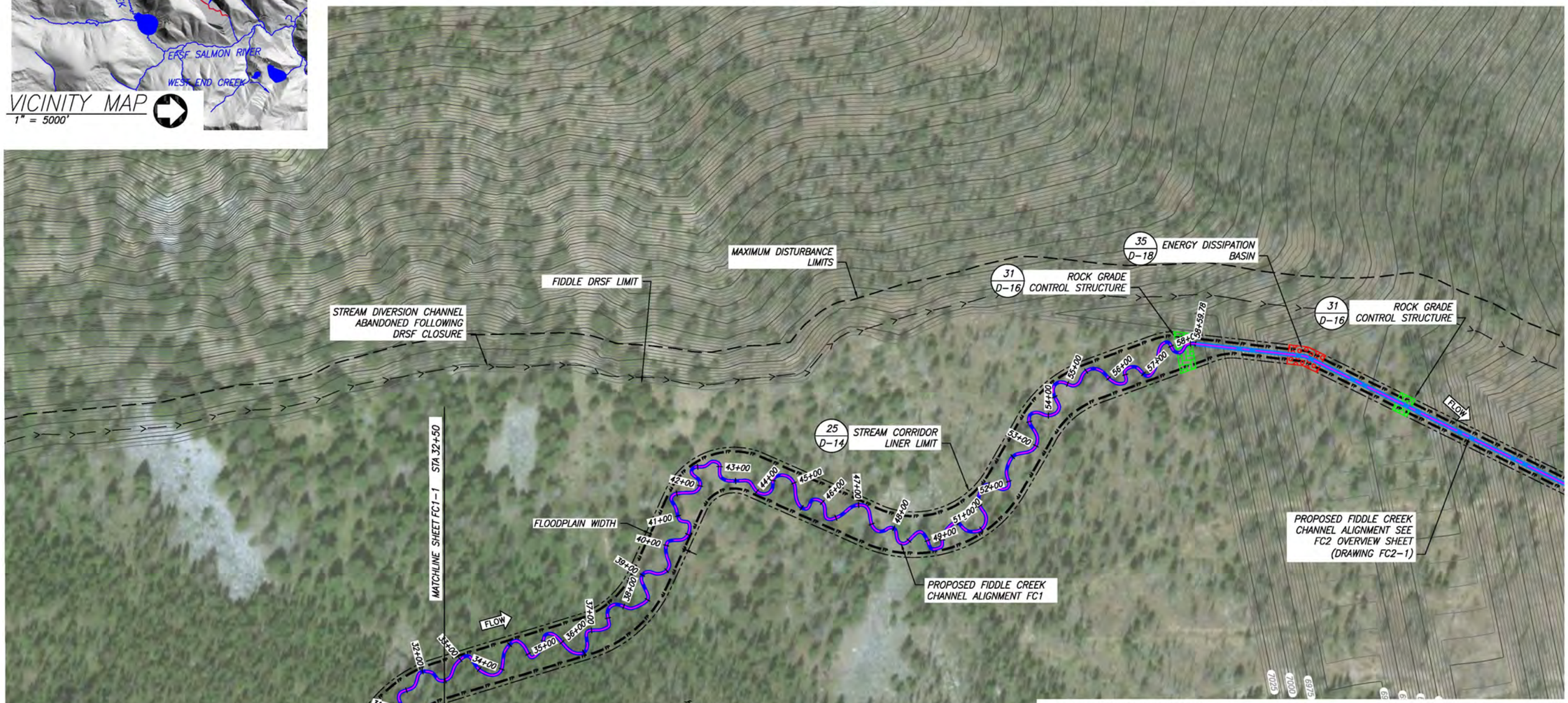
Drawing No.
FC1-1



VICINITY MAP
1" = 5000'

FC1 PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
FC1	3,822	5,860	1.5	1.00	0.65

FC1 PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
FC1	5,860	0



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON DRSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE DRSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. PROPOSED WETLANDS ARE NOT SHOWN. SEE SHEET FC1-5 THROUGH FC1-8 FOR WETLAND DESIGN.

FIDDLE CREEK REACH 1 – RESTORATION REACH SITE OVERVIEW PLAN

0 200 400 Feet

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MIDAS GOLD

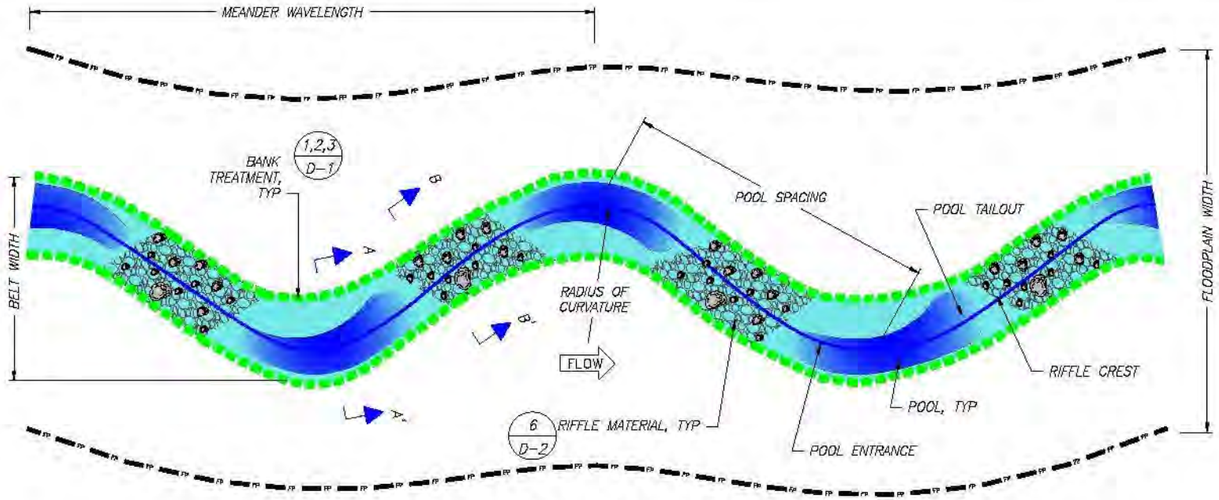
Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Fiddle Creek - Fiddle DRSF - Reach FC1
Valley County, Idaho

Draft

Date:	Feb. 2019
Designed:	JF, JY, MP
Drawn:	JF, JY, MP
Checked:	RR
Approved:	--

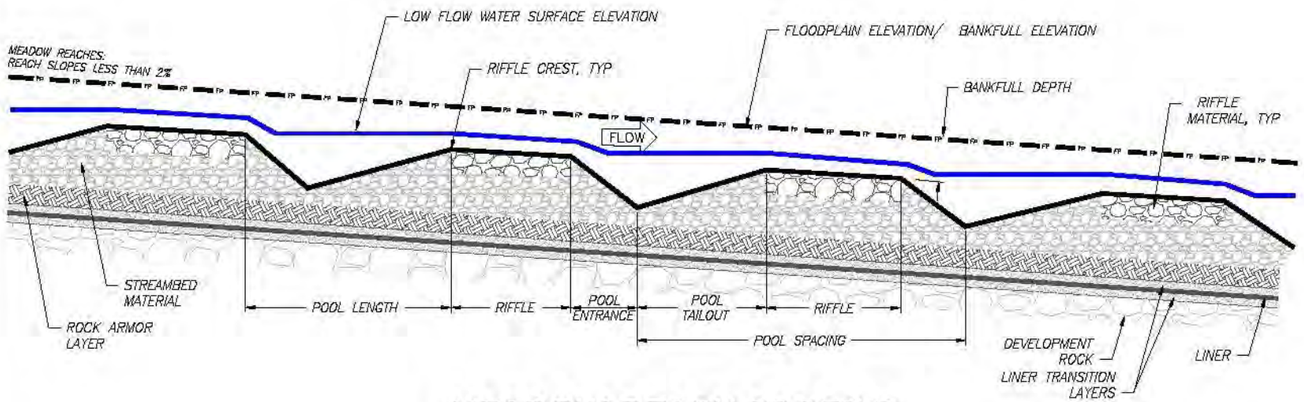
Drawing Name
FC1 Overview Sheet – 2

Drawing No.
FC1-2



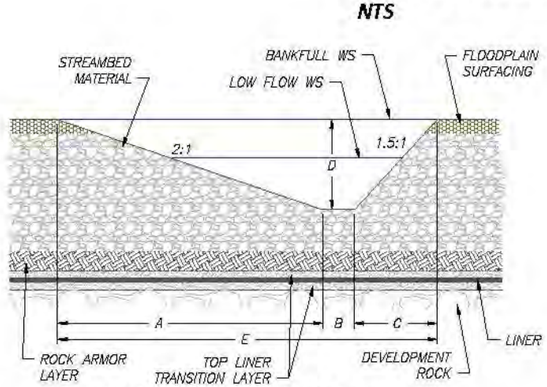
MEADOW REACH PLAN VIEW

NTS



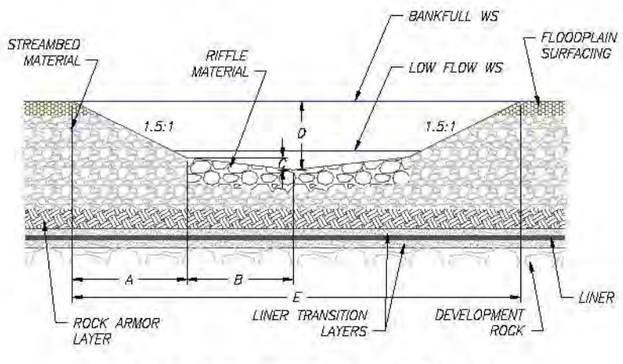
MEADOW REACH PROFILE

NTS



POOL SECTION A-A'

NTS



RIFFLE SECTION B-B'

NTS

NOTES

1. CHANNEL AND FLOODPLAIN SHALL BE CONSTRUCTED TO THE DIMENSIONS IDENTIFIED IN THE CHANNEL DEFINITION TABLES AND AT THE LOCATIONS SHOWN IN INDIVIDUAL REACH OVERVIEW PLAN SHEETS.
2. CHANNEL SIZING FOR TYPICAL POOL AND RIFFLE CROSS SECTIONS IS BASED ON CHANNEL FORMING (BANKFULL) DESIGN FLOW. DETAILED TYPICAL SECTIONS FOR OTHER STREAM HABITATS WILL BE DEVELOPED IN A FUTURE DESIGN PHASE.
3. BANK TREATMENT TYPES ARE NOT DEPICTED IN THE TYPICAL POOL AND RIFFLE SECTIONS. SEE SHEETS D-1 AND D-2 FOR BANK TREATMENT DETAILS.
4. SEE SHEETS D-3 THROUGH D-10 FOR HABITAT STRUCTURE DETAILS.
5. HABITAT STRUCTURE SPACING AND ASSOCIATED QUANTITIES ARE SUMMARIZED IN INDIVIDUAL REACH QUANTITY SHEETS.
6. SEE SHEETS D-1 AND D-20 FOR PLANTING AND SEEDING DETAILS AND PLANTING SCHEDULES.
7. SEE SHEETS D-13 THROUGH D-14 FOR TYPICAL FLOODPLAIN CROSS SECTIONS.

FC1 – MEADOW REACH
PROPOSED CHANNEL DEFINITION TABLES

PLAN TABLE									
REACH ID	BANKFULL FLOW (CFS)	BANKFULL WIDTH (FT)	WIDTH/ DEPTH RATIO	AVERAGE DEPTH AT BANKFULL (FT)	MEANDER WAVELENGTH (FT)	MEANDER BELT WIDTH (FT)	RADIUS OF CURVATURE (FT)	AVG POOL SPACING (FT)	FLOODPLAIN WIDTH (FT)
FC1	14	7	9	0.8	65 - 80	30 - 55	10 - 40	25 - 80	70

PROFILE TABLE				
REACH ID	RIFFLE LENGTH (FT)	POOL LENGTH (FT)	POOL ENTRANCE SLOPE (%)	POOL TAILOUT SLOPE (%)
FC1	10 - 75	5 - 15	38 - 45	19 - 46

MATERIALS TABLE								
REACH ID	STREAMBED MATERIAL TYPE	STREAMBED MATERIAL AVG THICKNESS (FT)	RIFFLE MATERIAL TYPE	RIFFLE MATERIAL AVG THICKNESS (FT)	FLOODPLAIN MATERIAL TYPE	FLOODPLAIN MATERIAL AVG THICKNESS (FT)	FLOODPLAIN SURFACING TYPE	FLOODPLAIN SURFACING AVG THICKNESS (FT)
FC1								

NOTES

1. MATERIALS TABLE TO BE DEVELOPED IN FUTURE DESIGN.
2. STREAMBED MATERIAL TYPES: S1 (D50 = XX"), S2 (D50 = XX"), S3 (D50 = XX").
3. RIFFLE MATERIAL TYPES: S1, S2, S3, R1 (D50 = XX"), R2 (D50 = XX").
4. FLOODPLAIN SURFACING MATERIAL TYPES: GROWTH MEDIA, ALGAE, HYDROMULCH, OR NONE.

SECTIONS TABLE					
SECTION	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)
POOL SECTION A - A'	4.0	0.3	3.0	2.0	7.3
RIFFLE SECTION B - B'	1.4	2.0	0.2	1.1	6.6

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MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Fiddle Creek - Fiddle DRSF - Reach FC1
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: ---

Drawing Name
FC1 Typical Plan and Profile

Drawing No.
FC1-3

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Low complexity of diversion channel, or pump and pipe (cleaner)
Stormwater Management			
BMPs and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	Low complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	0	CY	
Floodplain Excavation (Cut)	0	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	0	CY	
Engineered Streambed Material [3]	4,293	CY	5860 LF of new channel, 2.3 FT average streambed thickness
Sorting and Stockpiling [3]	17,443	CY	Includes Engineered Streambed Material and Rock Armoring/Grade Control
Rock Armoring/ Grade Control [3]	13,150	CY	6" thick layer over liner; (4) GCS; width x 20' x max scour depth
Ephemeral Swale Channel Material [3]	0	CY	
General Fill	43,332	CY	
Filter Material	78,897	CY	
Topsoil/ Growth Media [3]	24,867	CY	12" thickness within Liner Area
Liner	710,074	SF	Includes all material and labor
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	5,860	LF	Assumes 50% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	11,720	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	11,720	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	3,907	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	23,440	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	1,758	LF	Assumes 15% of total length of bank treatment
Brushlayer Live Cuttings	3,516	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	492	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	1,758	LF	Assumes 15% of total length of bank treatment
Brushlayer Live Cuttings	3,516	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	246	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	162	EA	2 per channel meander wave length
Riffle Material	1,197	CY	No. of riffles x 20' length x 10' width, 1ft thickness
Energy Dissipation Pool	0	EA	None
Boulders	0	EA	Based on bankfull width
Dissipation Pool Streambed Material	0	CY	Based on bankfull width, length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	40	EA	1 every 2 channel meander wave lengths
Foundation Logs	0	EA	0 per structure
Log with Rootwad	121	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	81	CY	2 CY per structure
Racking Material	81	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	147	EA	1 per 40 linear feet of new channel
Log with Rootwad	147	EA	1 per structure
Retaining Log	147	EA	1 per structure
Tight Radius Jam Structure	13	EA	1 every 6 channel meander wave lengths
Foundation Logs	94	EA	3 per structure
Log with Rootwad	81	EA	3 per structure
Small Woody Debris	175	CY	7 CY per structure
Racking Material	189	EA	7 per structure
Bend Jam Structure	13	EA	1 every 6 channel meander wave lengths
Foundation Logs	27	EA	2 per structure
Log with Rootwad	40	EA	3 per structure
Whole Tree	27	EA	1 per structure
Small Woody Debris	175	CY	13 CY per structure
Racking Material	202	EA	15 per structure
Sweeper Log Structure	40	EA	1 every 2 channel meander wave lengths
Whole Tree	40	EA	1 per structure
Small Woody Debris	121	CY	3 CY per structure
Racking Material	121	EA	3 per structure
Channel Spanning Jam	0	EA	None
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Wood Habitat Structure	13	EA	1 every 6 channel meander wave lengths
Log with Rootwad	54	EA	4 per structure
Small Woody Debris	40	CY	3 CY per structure
Racking Material	40	EA	3 per structure
Turning Log Structure	13	EA	1 every 6 channel meander wave lengths
Log with Rootwad	54	EA	4 per structure
Small Woody Debris	40	CY	3 CY per structure
Racking Material	40	EA	3 per structure
Boulders	27	EA	2 per structure
Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	10 per Alcove
Oxbow Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	25 per Alcove
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre
Zone 2	1,302	EA	4840 plants per acre
Zone 3	1,029	EA	3825 plants per acre
Zone 4	2,544	EA	1891 plants per acre
Seeding			
Zone 2	0.27	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.27	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	1.35	AC	5' width each side of channel; 19.02 pure live seed/AC

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MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Fiddle Creek - Fiddle DRSF - Reach FC1
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
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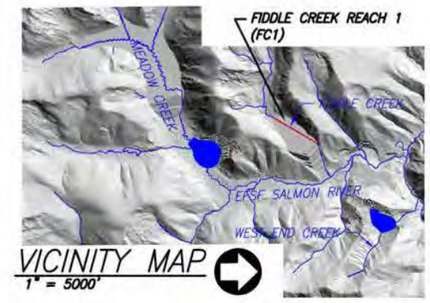
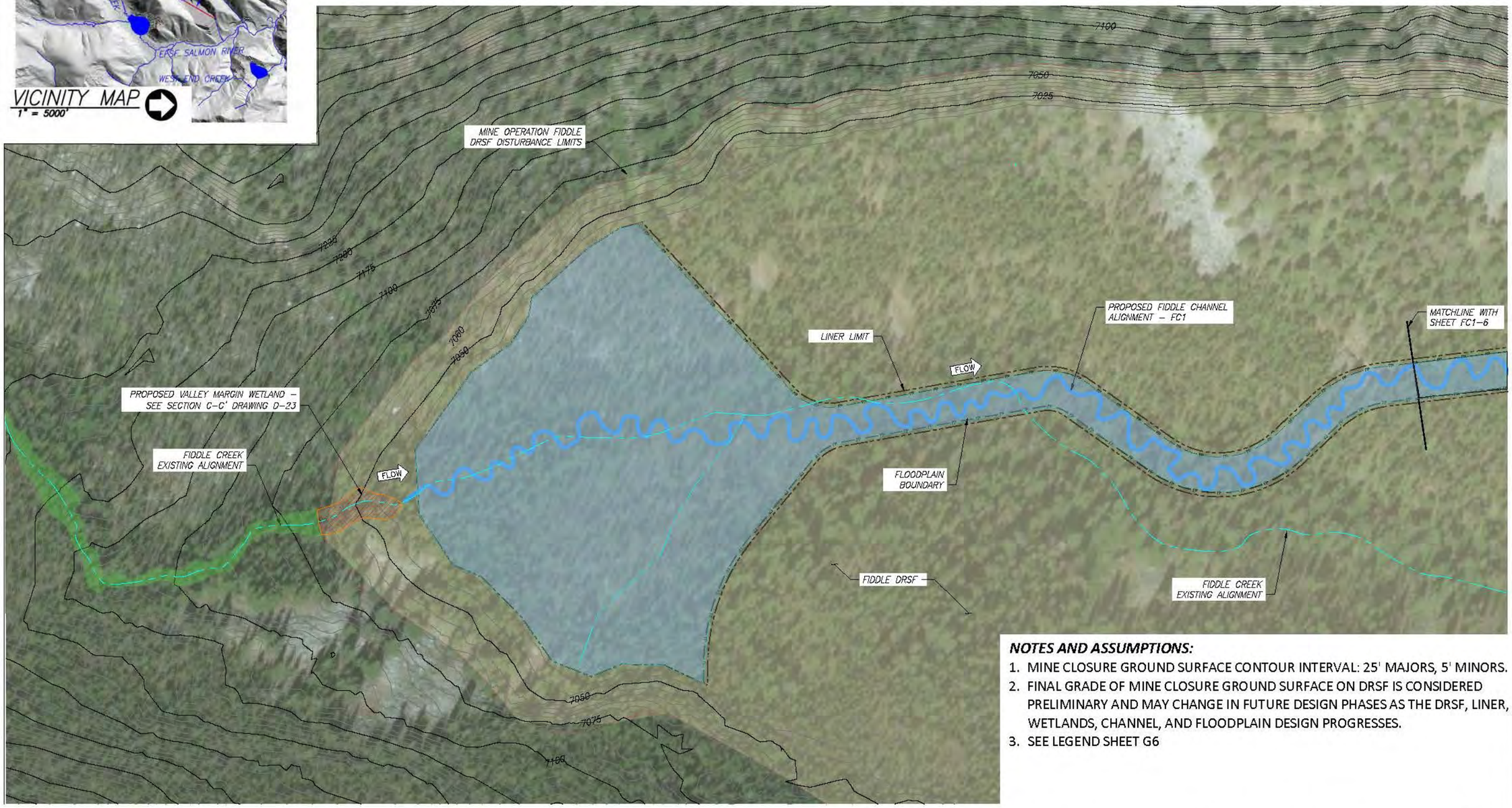
Approved: ---

Drawing Name
FC1 Quantities

Drawing No.
FC1-4



VICINITY MAP
1" = 5000'



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON DRSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE DRSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. SEE LEGEND SHEET G6

FIDDLE CREEK REACH1 WETLANDS OVERVIEW PLAN

0 200

TETRA TECH

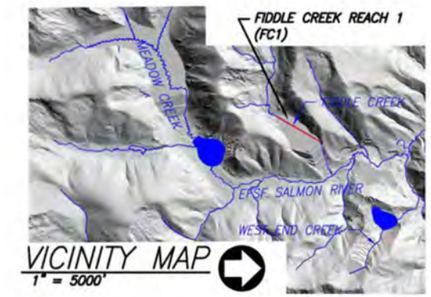
MIDAS GOLD

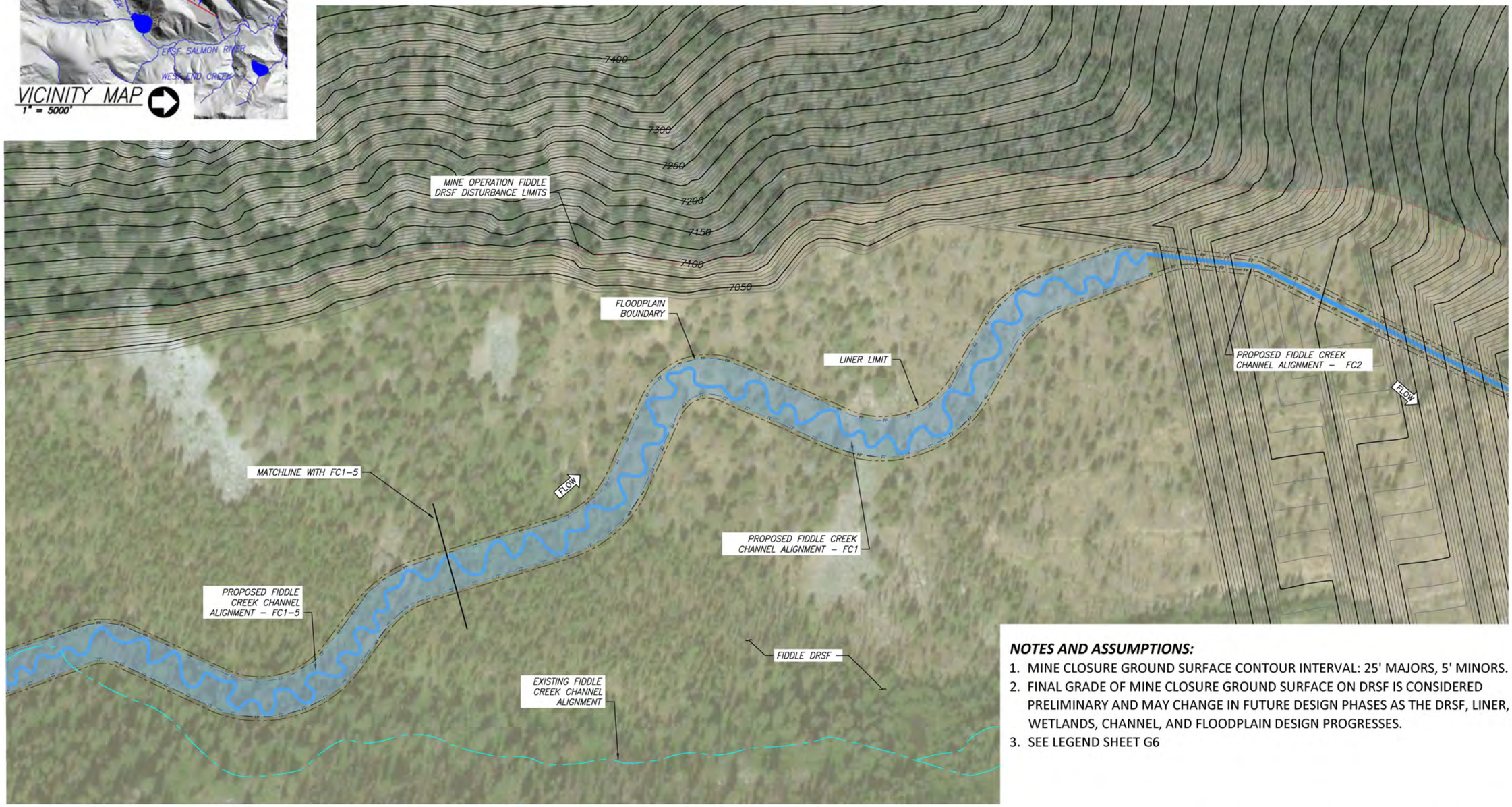
Draft

Date: Feb. 2019
Designed: LC, JHD
Drawn: JHD
Checked: LC
Approved: --

Drawing Name
FC1 Wetland Sheet – 1

Drawing No.
FC1–5





NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON DRSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE DRSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. SEE LEGEND SHEET G6

FIDDLE CREEK REACH 2 WETLANDS OVERVIEW PLAN

0 200

TETRA TECH

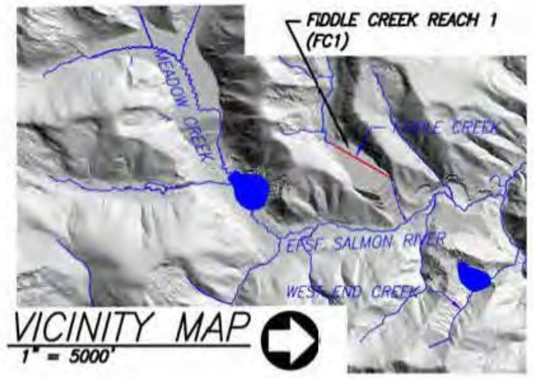
MIDAS GOLD

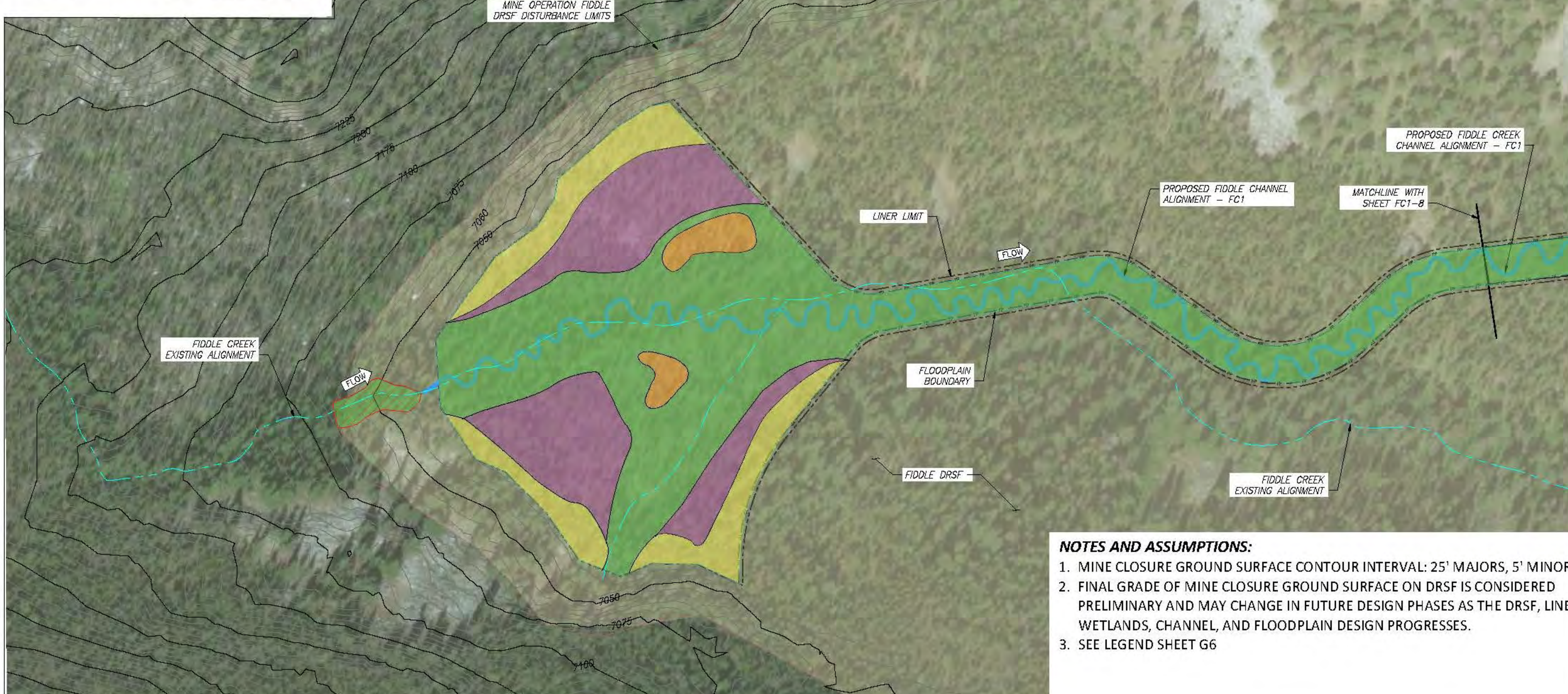
Draft

Date: Feb. 2019
Designed: LC, JHD
Drawn: JHD
Checked: LC
Approved: --

Drawing Name
FC1 Wetland Sheet – 2

Drawing No.
FC1–6





NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON DRSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE DRSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. SEE LEGEND SHEET G6

FIDDLE CREEK REACH 1 WETLANDS PLANTING PLAN

0 200

TETRA TECH

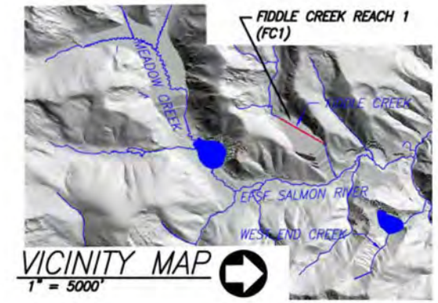
MIDAS GOLD

Draft

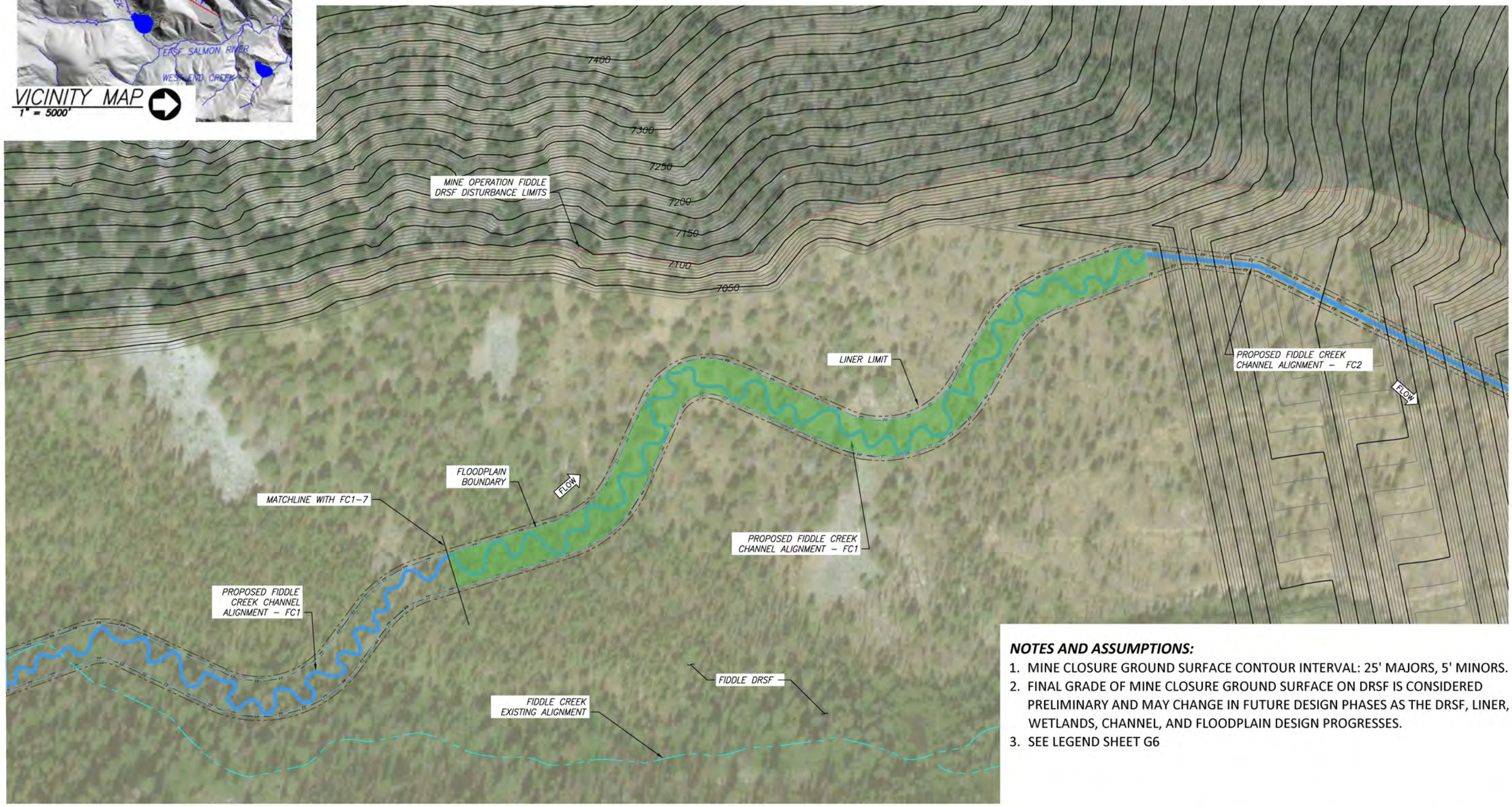
Date: Feb. 2019
Designed: LC, JHD
Drawn: JHD
Checked: LC
Approved: ––

Drawing Name
FC1 Wetland Planting Sheet – 1

Drawing No.
FC1–7



VICINITY MAP
1" = 5000'



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON DRSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE DRSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. SEE LEGEND SHEET G6

FIDDLE CREEK REACH 2 WETLANDS PLANTING PLAN

0 200

TETRA TECH

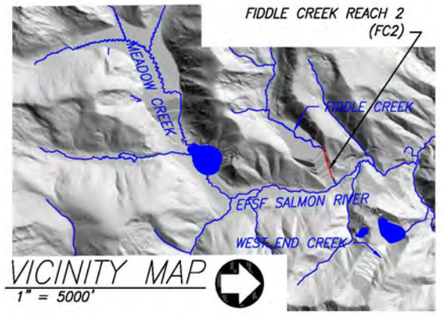
MIDAS GOLD

Draft

Date: Feb. 2019
Designed: LC, JHD
Drawn: JHD
Checked: LC
Approved: --

Drawing Name
FC1 Wetland Planting Sheet – 2

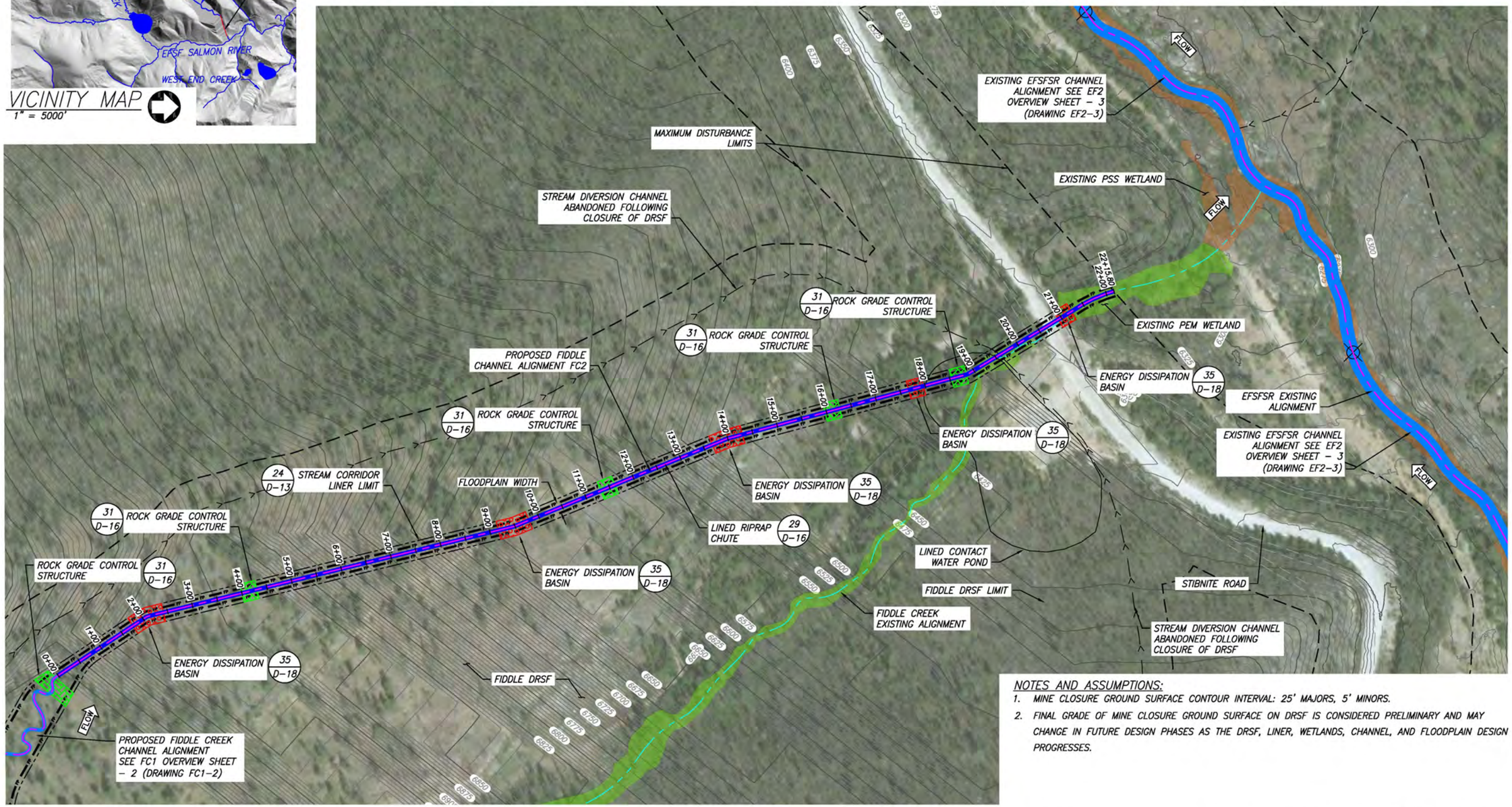
Drawing No.
FC1–8



VICINITY MAP
1" = 5000'

FC2 PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
FC2	2,106	2,216	1.1	34.19	32.49

FC2 PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
FC2	2,216	0



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON DRSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE DRSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.

FIDDLE CREEK REACH 2 – RESTORATION REACH SITE OVERVIEW PLAN

0 200 400 Feet

Applied Science & Engineering
2449 S. Vista Ave. Suite B
Boise, Idaho 83705

MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Fiddle Creek - Fiddle DRSF - Reach FC2
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: --

Drawing Name
FC2 Overview Sheet

Drawing No.
FC2–1

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Low complexity of diversion channel, or pump and pipe (cleaner)
Stormwater Management			
BMPs and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	Low complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	0	CY	
Floodplain Excavation (Cut)	0	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	0	CY	
Engineered Streambed Material [3]	5,515	CY	2216 LF of new channel; 3 FT average streambed thickness
Sorting and Stockpiling [3]	11,234	CY	Includes Engineered Streambed Material and Rock Armoring/Grade Control
Rock Armoring/ Grade Control [3]	5,719	CY	(4) grade control structure; floodplain width x 20' x max scour depth
Ephemeral Swale Channel Material [3]	0	CY	
General Fill	0	CY	
Filter Material	8,617	CY	
Topsoil/ Growth Media [3]	0	CY	
Liner	77,550	SF	Includes all material and labor
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	0	LF	Assumes 0% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	0	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	0	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	0	LF	Assumes 0% of total length of bank treatment
Brushlayer Live Cuttings	0	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	0	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	0	LF	Assumes 0% of total length of bank treatment
Brushlayer Live Cuttings	0	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	0	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	0	EA	None
Riffle Material	0	CY	No. of riffles x 20' length x 10' width; 1ft thickness
Energy Dissipation Pool	5	EA	No. varies by reach
Boulders	200	EA	Based on bankfull width
Dissipation Pool Streambed Material	182	CY	Based on bankfull width; length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	0	EA	None
Foundation Logs	0	EA	0 per structure
Log with Rootwad	0	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	0	CY	2 CY per structure
Racking Material	0	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	0	EA	None
Log with Rootwad	0	EA	1 per structure
Retaining Log	0	EA	1 per structure
Tight Radius Jam Structure	0	EA	None
Foundation Logs	0	EA	3 per structure
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	7 CY per structure
Racking Material	0	EA	7 per structure
Bend Jam Structure	0	EA	None
Foundation Logs	0	EA	2 per structure
Log with Rootwad	0	EA	3 per structure
Whole Tree	0	EA	1 per structure
Small Woody Debris	0	CY	13 CY per structure
Racking Material	0	EA	15 per structure
Sweeper Log Structure	0	EA	None
Whole Tree	0	EA	1 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Channel Spanning Jam	0	EA	None
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Wood Habitat Structure	0	EA	None
Log with Rootwad	0	EA	4 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Turning Log Structure	0	EA	None
Log with Rootwad	0	EA	4 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Boulders	0	EA	2 per structure
Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	10 per Alcove
Oxbow Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	25 per Alcove
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre
Zone 2	492	EA	4840 plants per acre
Zone 3	389	EA	3825 plants per acre
Zone 4	962	EA	1891 plants per acre
Seeding			
Zone 2	0.10	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.10	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	0.51	AC	5' width each side of channel; 19.02 pure live seed/AC

Applied Science & Engineering
2449 S. Vista Ave. Suite B
Boise, Idaho 83705

MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Fiddle Creek - Fiddle DRSF - Reach FC2
Valley County, Idaho

Draft

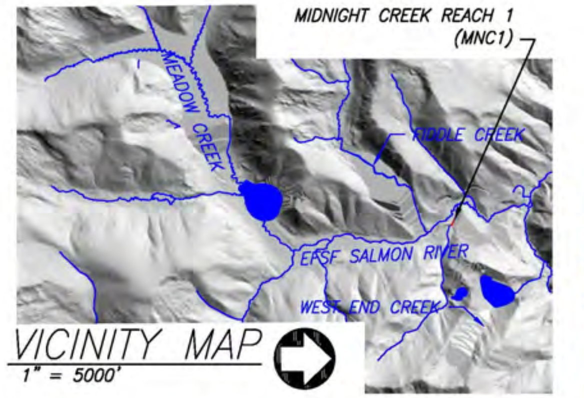
Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: —

Drawing Name
FC2 Quantities

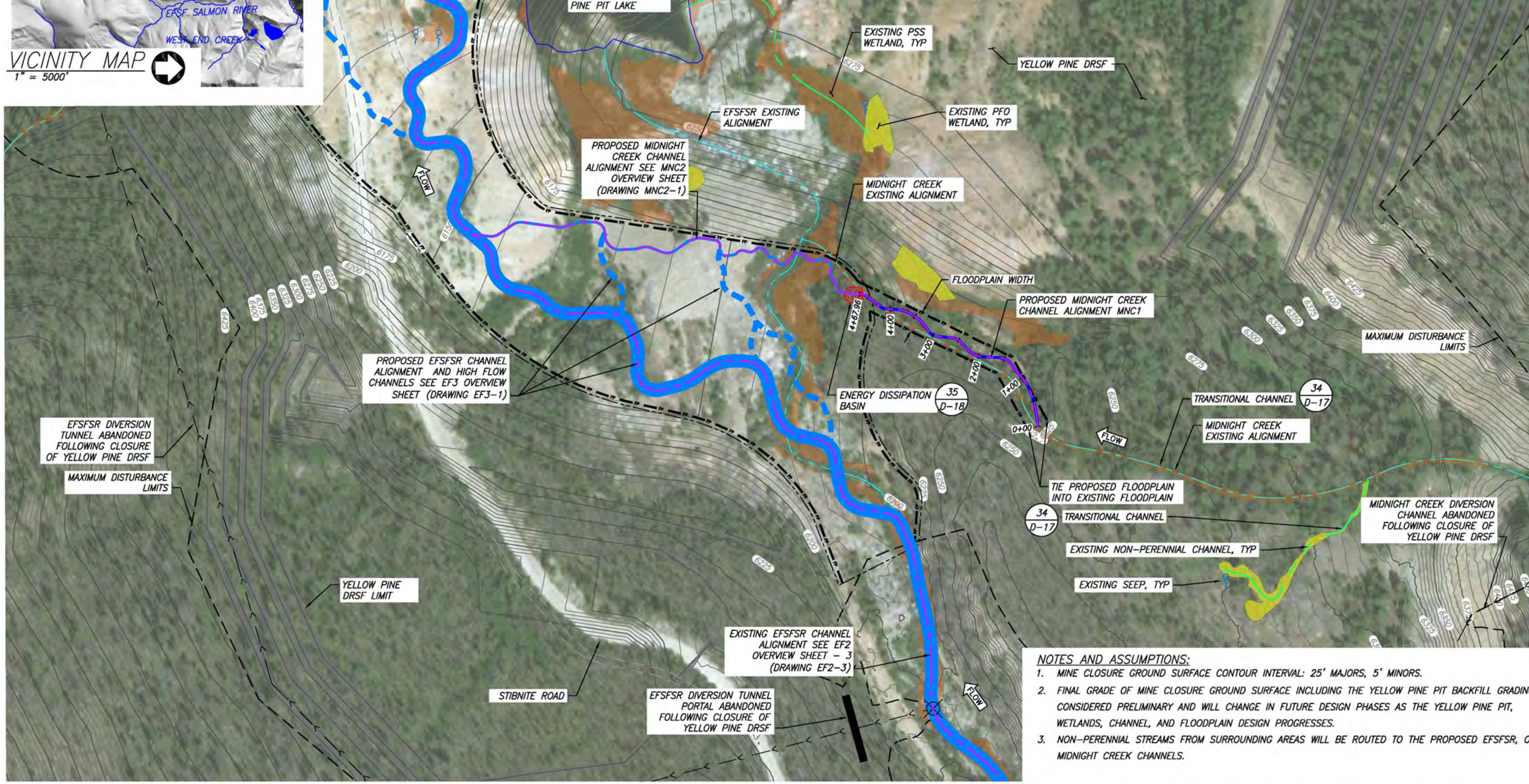
Drawing No.
FC2-2

MNC1 PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
MNC1	440	468	1.1	9.09	8.55

MNC1 PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
MNC1	468	0



VICINITY MAP
1" = 5000'



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE INCLUDING THE YELLOW PINE PIT BACKFILL GRADING IS CONSIDERED PRELIMINARY AND WILL CHANGE IN FUTURE DESIGN PHASES AS THE YELLOW PINE PIT, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. NON-PERENNIAL STREAMS FROM SURROUNDING AREAS WILL BE ROUTED TO THE PROPOSED EFSFSR, OR MIDNIGHT CREEK CHANNELS.

MIDNIGHT CREEK REACH 1 – RESTORATION REACH SITE OVERVIEW PLAN

0 200 400 Feet

Rio Applied Science & Engineering
2449 S. Vista Ave. Suite B
Boise, Idaho 83705

MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Midnight Creek - Yellow Pine Pit - Reach MNC1
Valley County, Idaho

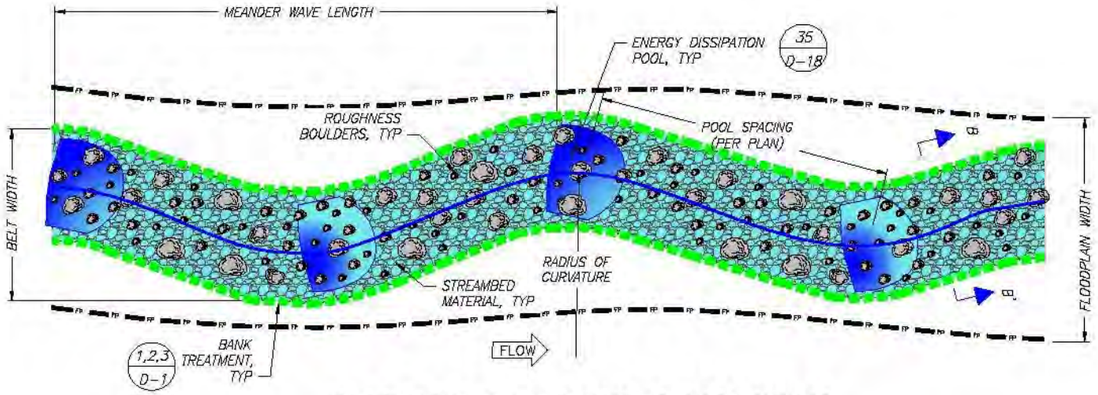
Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: --

Drawing Name
MNC1 Overview Sheet

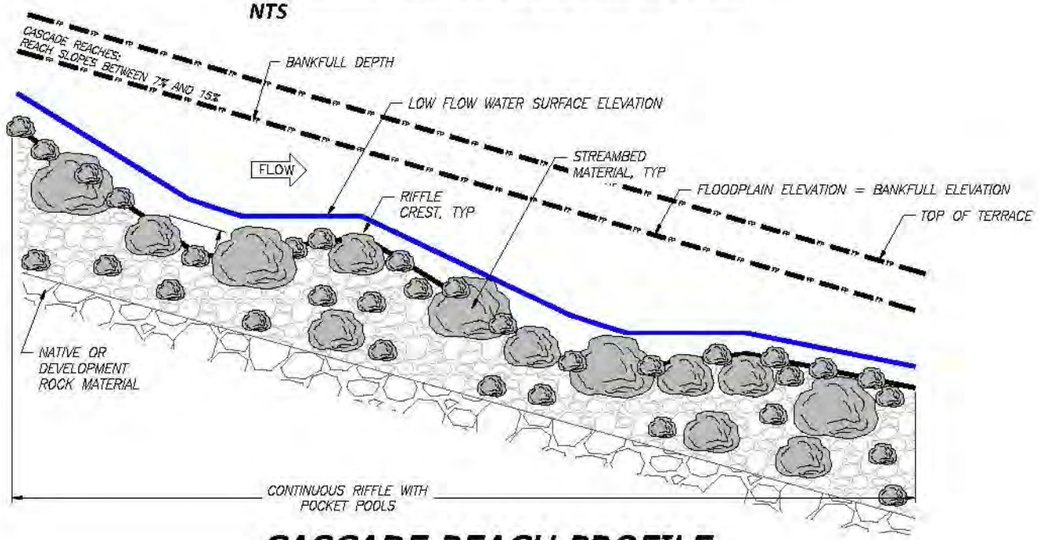
Drawing No.
MNC1-1

LOCATION: R:\PROJECTS\SF_SALMON_HUC90\STIBNITE_RESTORATION_MIDAS\CAD\PRODUCTION\MNC1_YELLOWPINEPIT_CONCEPTDESIGN.DWG PLOT DATE: 2/1/2019



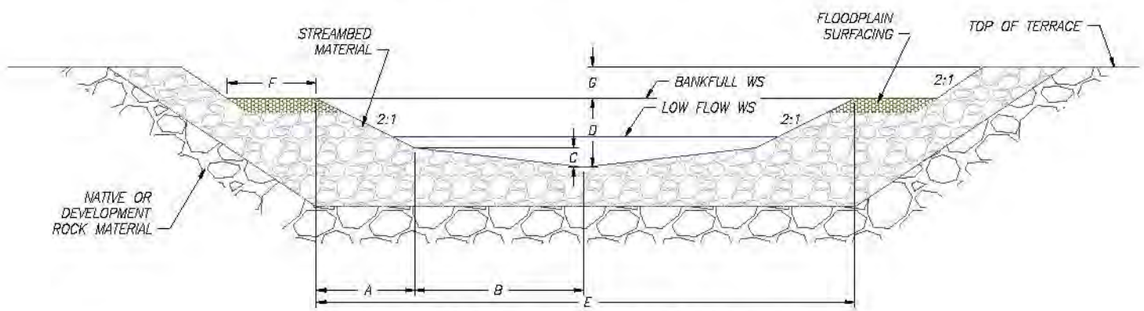
CASCADE REACH PLAN VIEW

NTS



CASCADE REACH PROFILE

NTS



RIFFLE SECTION B-B'

NTS

NOTES
1. CHANNEL AND FLOODPLAIN SHALL BE CONSTRUCTED TO THE DIMENSIONS IDENTIFIED IN THE CHANNEL DEFINITION TABLES AND AT THE LOCATIONS SHOWN IN INDIVIDUAL REACH OVERVIEW PLAN SHEETS.
2. CHANNEL SIZING FOR TYPICAL POOL AND RIFFLE CROSS SECTIONS IS BASED ON CHANNEL FORMING (BANKFULL) DESIGN FLOW. DETAILED TYPICAL SECTIONS FOR OTHER STREAM HABITATS WILL BE DEVELOPED IN A FUTURE DESIGN PHASE.
3. CASCADE REACHES ARE NOT EXPECTED TO HAVE BANK TREATMENT TYPES OR HABITAT STRUCTURES.
4. SEE SHEET D-18 FOR DISSIPATION POOL DETAILS.
5. LOCATION OF CASCADE REACH DISSIPATION POOLS ARE SHOWN IN INDIVIDUAL REACH OVERVIEW PLAN SHEETS. ASSOCIATED QUANTITIES ARE SUMMARIZED IN INDIVIDUAL REACH QUANTITY SHEETS.
6. SEE SHEETS D-1 AND D-20 FOR PLANTING AND SEEDING DETAILS AND PLANTING SCHEDULES.

MNC1 – CASCADE REACH
PROPOSED CHANNEL DEFINITION TABLES

PLAN TABLE

REACH ID	BANKFULL FLOW (CFS)	BANKFULL WIDTH (FT)	WIDTH/ DEPTH RATIO	AVERAGE DEPTH AT BANKFULL (FT)	MEANDER WAVELENGTH (FT)	MEANDER BELT WIDTH (FT)	RADIUS OF CURVATURE (FT)	AVG POOL SPACING (FT)	FLOODPLAIN WIDTH (FT)
MNC1	**9**	**6**	**9**	**0.7**	**NA**	**NA**	**NA**	**NA**	**NA**

PROFILE TABLE

REACH ID	RIFFLE LENGTH (FT)	POOL LENGTH (FT)	POOL ENTRANCE SLOPE (%)	POOL TAILOUT SLOPE (%)
MNC1	**NA**	**NA**	**NA**	**NA**

NOTES
1. RIFFLE LENGTH INDICATED IN INDIVIDUAL REACH OVERVIEW PLAN SHEETS.
2. SEE DISSIPATION POOL DETAILS FOR POOL LENGTH AND ASSOCIATED DIMENSIONS.

MATERIALS TABLE

REACH ID	STREAMBED MATERIAL TYPE	STREAMBED MATERIAL AVG THICKNESS (FT)	RIFFLE MATERIAL TYPE	RIFFLE MATERIAL AVG THICKNESS (FT)	FLOODPLAIN MATERIAL TYPE	FLOODPLAIN MATERIAL AVG THICKNESS (FT)	FLOODPLAIN SURFACING TYPE	FLOODPLAIN SURFACING AVG THICKNESS (FT)

NOTES
1. MATERIALS TABLE TO BE DEVELOPED IN FUTURE DESIGN.
2. STREAMBED MATERIAL TYPES: S1 (D50 = XX"), S2 (D50 = XX"), S3 (D50 = XX").
3. RIFFLE MATERIAL TYPES: S1, S2, S3, R1 (D50 = XX"), R2 (D50 = XX").
4. FLOODPLAIN SURFACING MATERIAL TYPES: GROWTH MEDIA, ALGAE, HYDROMULCH, OR NONE.

SECTION TABLE

SECTION	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)	F (FT)	G (FT)
RIFFLE SECTION B - B'	**1.2**	**2.0**	**0.1**	**0.9**	**6.3**	**5.0**	**2.0**

NOTE
1. SEE DISSIPATION POOL DETAILS FOR POOL LENGTH AND ASSOCIATED DIMENSIONS.

Applied Science & Engineering
2495 S. Vista Ave. Suite B
Boise, Idaho 83705

MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Midnight Creek - Yellow Pine Pit - Reach MNC1
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: ---

Drawing Name
MNC1 Typical Plan and Profile

Drawing No.
MNC1-2

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Low complexity of diversion channel, or pump and pipe (cleaner)
Stormwater Management			
BMPs and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	Low complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	0	CY	
Floodplain Excavation (Cut)	0	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	0	CY	
Engineered Streambed Material [3]	283	CY	468 LF of new channel;1 FT streambed thickness;12 SF XS
Sorting and Stockpiling [3]	283	CY	Includes both Engineered Streambed Material and Rock Armoring
Rock Armoring/ Grade Control [3]	0	CY	
Ephemeral Swale Channel Material [3]	0	CY	
General Fill	0	CY	
Filter Material	0	CY	
Topsoil/ Growth Media [3]	173	CY	12" thickness in Zone 3
Liner	0	SF	
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	468	LF	Assumes 50% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	936	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	936	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	312	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	1,872	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	140	LF	Assumes 15% of total length of bank treatment
Brushlayer Live Cuttings	281	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	39	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	140	LF	Assumes 15% of total length of bank treatment
Brushlayer Live Cuttings	281	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	20	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	37	EA	2 per channel meander wave length
Riffle Material	275	CY	No. of riffles x 20' length x 10' width; 1ft thickness
Energy Dissipation Pool	0	EA	None
Boulders	0	EA	Based on bankfull width
Dissipation Pool Streambed Material	0	CY	Based on bankfull width, length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	2	EA	1 every 8 channel meander wave lengths
Foundation Logs	0	EA	0 per structure
Log with Rootwad	7	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	5	CY	2 CY per structure
Racking Material	5	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	9	EA	1 per 50 linear feet of new channel
Log with Rootwad	9	EA	1 per structure
Retaining Log	9	EA	1 per structure
Tight Radius Jam Structure	1	EA	1 every 16 channel meander wave lengths
Foundation Logs	8	EA	3 per structure
Log with Rootwad	7	EA	3 per structure
Small Woody Debris	15	CY	7 CY per structure
Racking Material	16	EA	7 per structure
Bend Jam Structure	2	EA	1 every 8 channel meander wave lengths
Foundation Logs	5	EA	2 per structure
Log with Rootwad	7	EA	3 per structure
Whole Tree	5	EA	1 per structure
Small Woody Debris	30	CY	13 CY per structure
Racking Material	35	EA	15 per structure
Sweeper Log Structure	2	EA	1 every 8 channel meander wave lengths
Whole Tree	2	EA	1 per structure
Small Woody Debris	7	CY	3 CY per structure
Racking Material	7	EA	3 per structure
Channel Spanning Jam	0	EA	None
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Wood Habitat Structure	2	EA	1 every 8 channel meander wave lengths
Log with Rootwad	9	EA	4 per structure
Small Woody Debris	7	CY	3 CY per structure
Racking Material	7	EA	3 per structure
Turning Log Structure	1	EA	1 every 16 channel meander wave lengths
Log with Rootwad	5	EA	4 per structure
Small Woody Debris	3	CY	3 CY per structure
Racking Material	3	EA	3 per structure
Boulders	2	EA	2 per structure
Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	10 per Alcove
Oxbow Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	25 per Alcove
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre. Intended for anually wet areas
Zone 2	104	EA	4840 plants per acre
Zone 3	82	EA	3825 plants per acre
Zone 4	203	EA	1891 plants per acre
Seeding			
Zone 2	0.02	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.02	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	0.11	AC	5' width each side of channel; 19.02 pure live seed/AC

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MIDAS GOLD

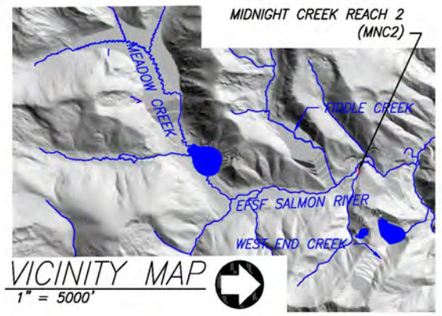
Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Midnight Creek - Yellow Pine Pit - Reach MNC1
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: —

Drawing Name
MNC1 Quantities

Drawing No.
MNC1–3



VICINITY MAP
1" = 5000'

MNC2 PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
MNC2	760	893	1.2	4.42	3.76

MNC2 PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
MNC2	893	0

EXISTING YELLOW PINE PIT LAKE
EXISTING PSS WETLAND, TYP
YELLOW PINE DRSF
EFSFSR EXISTING ALIGNMENT
EXISTING PFO WETLAND, TYP
PROPOSED MIDNIGHT CREEK CHANNEL ALIGNMENT MNC2
MIDNIGHT CREEK EXISTING ALIGNMENT
PROPOSED MIDNIGHT CREEK CHANNEL ALIGNMENT SEE MNC1 OVERVIEW SHEET (DRAWING MNC1-1)
MAXIMUM DISTURBANCE LIMITS
PROPOSED EFSFSR CHANNEL ALIGNMENT AND HIGH FLOW CHANNELS SEE EF3 OVERVIEW SHEET (DRAWING EF3-1)
ENERGY DISSIPATION BASIN 35 D-18
EFSFSR DIVERSION TUNNEL ABANDONED FOLLOWING CLOSURE OF YELLOW PINE DRSF
MAXIMUM DISTURBANCE LIMITS
MIDNIGHT CREEK EXISTING ALIGNMENT
EXISTING NON-PERENNIAL CHANNEL, TYP
MIDNIGHT CREEK DIVERSION CHANNEL ABANDONED FOLLOWING CLOSURE OF YELLOW PINE DRSF
EXISTING SEEP, TYP
YELLOW PINE DRSF LIMIT
EXISTING EFSFSR CHANNEL ALIGNMENT SEE EF2 OVERVIEW SHEET - 3 (DRAWING EF2-3)
STIBNITE ROAD
EFSFSR DIVERSION TUNNEL PORTAL ABANDONED FOLLOWING CLOSURE OF YELLOW PINE DRSF
FLOW

NOTES AND ASSUMPTIONS:
1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE INCLUDING THE YELLOW PINE PIT BACKFILL GRADING IS CONSIDERED PRELIMINARY AND WILL CHANGE IN FUTURE DESIGN PHASES AS THE YELLOW PINE PIT, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. NON-PERENNIAL STREAMS FROM SURROUNDING AREAS WILL BE ROUTED TO THE PROPOSED EFSFSR, HENNESSY CREEK, OR MIDNIGHT CREEK CHANNELS.
4. PROPOSED WETLANDS ARE NOT SHOWN. SEE SHEET EF3-4 THROUGH EF3-5 FOR WETLAND DESIGN.

0 200 400 Feet

MIDNIGHT CREEK REACH 2 - RESTORATION REACH SITE OVERVIEW PLAN

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MIDAS GOLD

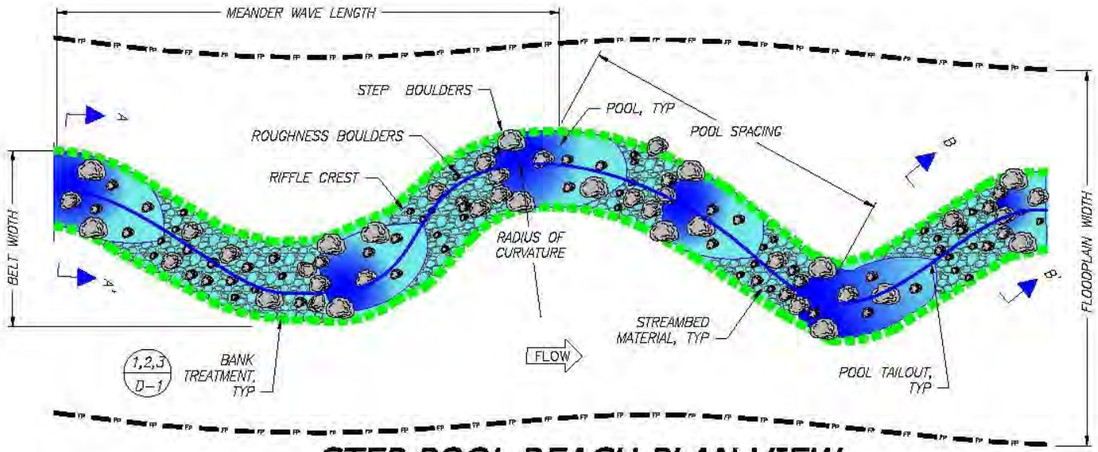
Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Midnight Creek - Yellow Pine Pit - Reach MNC2
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: ---

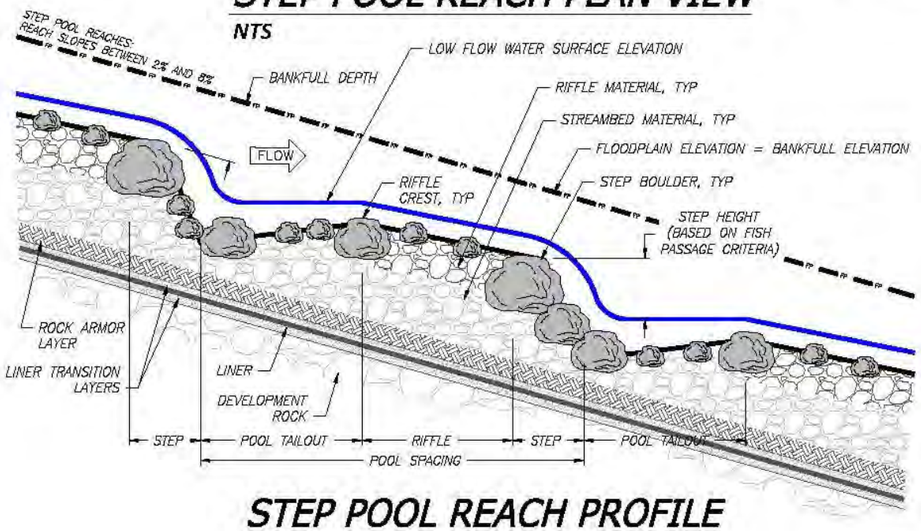
Drawing Name
MNC2 Overview Sheet

Drawing No.
MNC2-1



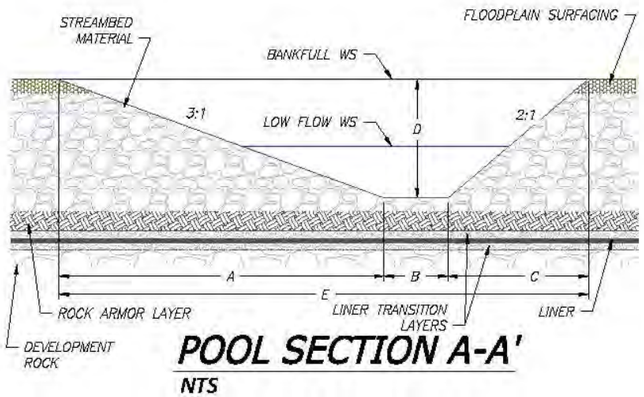
STEP POOL REACH PLAN VIEW

NTS



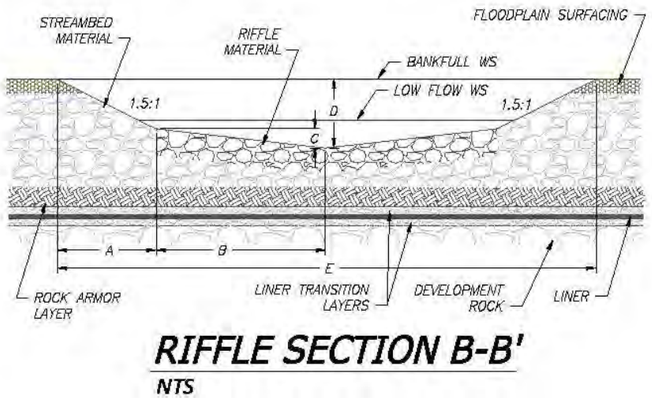
STEP POOL REACH PROFILE

NTS



POOL SECTION A-A'

NTS



RIFFLE SECTION B-B'

NTS

NOTES

1. CHANNEL AND FLOODPLAIN SHALL BE CONSTRUCTED TO THE DIMENSIONS IDENTIFIED IN THE CHANNEL DEFINITION TABLES AND AT THE LOCATIONS SHOWN IN INDIVIDUAL REACH OVERVIEW PLAN SHEETS.
2. CHANNEL SIZING FOR TYPICAL POOL AND RIFFLE CROSS SECTIONS IS BASED ON CHANNEL FORMING (BANKFULL) DESIGN FLOW. DETAILED TYPICAL SECTIONS FOR OTHER STREAM HABITATS WILL BE DEVELOPED IN A FUTURE DESIGN PHASE.
3. BANK TREATMENT TYPES ARE NOT DEPICTED IN THE TYPICAL POOL AND RIFFLE SECTIONS. SEE SHEETS D-1 AND D-2 FOR BANK TREATMENT DETAILS.
4. SEE SHEETS D-3 THROUGH D-10 FOR HABITAT STRUCTURE DETAILS.
5. HABITAT STRUCTURE SPACING AND ASSOCIATED QUANTITIES ARE SUMMARIZED IN INDIVIDUAL REACH QUANTITY SHEETS.
6. SEE SHEETS D-1 AND D-20 FOR PLANTING AND SEEDING DETAILS AND PLANTING SCHEDULES.
7. SEE SHEETS D-13 THROUGH D-14 FOR TYPICAL FLOODPLAIN CROSS SECTIONS.
2. ROCK ARMOR LAYER TO SPAN CHANNEL WIDTH, AS SHOWN, CONTINUOUSLY ALONG LONGITUDINAL PROFILE.
3. ROCK ARMOR LAYER TO SPAN VALLEY WIDTH, AS SHOWN, AT STRATEGIC LOCATIONS (TBD) ALONG LONGITUDINAL PROFILE.

MNC2 – STEP POOL REACH
PROPOSED CHANNEL DEFINITION TABLES

PLAN TABLE									
REACH ID	BANKFULL FLOW (CFS)	BANKFULL WIDTH (FT)	WIDTH/ DEPTH RATIO	AVERAGE DEPTH AT BANKFULL (FT)	MEANDER WAVELENGTH (FT)	MEANDER BELT WIDTH (FT)	RADIUS OF CURVATURE (FT)	AVG POOL SPACING (FT)	FLOODPLAIN WIDTH (FT)
MNC2	9	6	9	0.6	55 - 70	25 - 35	10 - 35	25 - 70	NA

PROFILE TABLE				
REACH ID	RIFFLE LENGTH (FT)	POOL LENGTH (FT)	POOL ENTRANCE SLOPE (%)	POOL TAILOUT SLOPE (%)
MNC2	10 - 65	5 - 15	32 - 45	16 - 39

MATERIALS TABLE								
REACH ID	STREAMBED MATERIAL TYPE	STREAMBED MATERIAL AVG THICKNESS (FT)	RIFFLE MATERIAL TYPE	RIFFLE MATERIAL AVG THICKNESS (FT)	FLOODPLAIN MATERIAL TYPE	FLOODPLAIN MATERIAL AVG THICKNESS (FT)	FLOODPLAIN SURFACING TYPE	FLOODPLAIN SURFACING AVG THICKNESS (FT)
MNC2								

NOTES

1. MATERIALS TABLE TO BE DEVELOPED IN FUTURE DESIGN.
2. STREAMBED MATERIAL TYPES: S1 (D50 = XX"), S2 (D50 = XX"), S3 (D50 = XX").
3. RIFFLE MATERIAL TYPES: S1, S2, S3, R1 (D50 = XX"), R2 (D50 = XX").
4. FLOODPLAIN SURFACING MATERIAL TYPES: GROWTH MEDIA, ALGAE, HYDROMULCH, OR NONE.

SECTIONS TABLE					
SECTION	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)
POOL SECTION A - A'	3.0	0.4	3.0	1.5	6.4
RIFFLE SECTION B - B'	1.1	2.0	0.1	0.8	5.8

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MIDAS GOLD

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Stream and Wetland Restoration Concept Design
Midnight Creek - Yellow Pine Pit - Reach MNC2
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: --

Drawing Name
MNC2 Typical Plan and Profile

Drawing No.
MNC2-2

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Low complexity of diversion channel, or pump and pipe (cleaner)
Stormwater Management			
BMPs and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	Low complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	0	CY	
Floodplain Excavation (Cut)	0	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	0	CY	
Engineered Streambed Material [3]	389	CY	886 LF of new channel;1 FT streambed thickness;12 SF XS
Sorting and Stockpiling [3]	389	CY	Includes both Engineered Streambed Material and Rock Armoring
Rock Armoring/ Grade Control [3]	0	CY	
Ephemeral Swale Channel Material [3]	0	CY	
General Fill	0	CY	
Filter Material	0	CY	
Topsoil/ Growth Media [3]	328	CY	12" thickness in Zone 3
Liner	0	SF	
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	0	LF	Assumes 0% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	0	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	0	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	354	LF	Assumes 20% of total length of bank treatment
Brushlayer Live Cuttings	709	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	99	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	1,063	LF	Assumes 60% of total length of bank treatment
Brushlayer Live Cuttings	2,126	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	149	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	28	EA	2 per channel meander wave length
Riffle Material	208	CY	No. of riffles x 20' length x 10' width; 1ft thickness
Energy Dissipation Pool	1	EA	No. varies by reach
Boulders	29	EA	Based on bankfull width
Dissipation Pool Streambed Material	7	CY	Based on bankfull width; length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	2	EA	1 every 8 channel meander wave lengths
Foundation Logs	0	EA	0 per structure
Log with Rootwad	5	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	4	CY	2 CY per structure
Racking Material	4	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	22	EA	1 per 40 linear feet of new channel
Log with Rootwad	22	EA	1 per structure
Retaining Log	22	EA	1 per structure
Tight Radius Jam Structure	1	EA	1 every 16 channel meander wave lengths
Foundation Logs	6	EA	3 per structure
Log with Rootwad	5	EA	3 per structure
Small Woody Debris	11	CY	7 CY per structure
Racking Material	12	EA	7 per structure
Bend Jam Structure	2	EA	1 every 8 channel meander wave lengths
Foundation Logs	4	EA	2 per structure
Log with Rootwad	5	EA	3 per structure
Whole Tree	4	EA	1 per structure
Small Woody Debris	23	CY	13 CY per structure
Racking Material	26	EA	15 per structure
Sweeper Log Structure	7	EA	1 every 2 channel meander wave lengths
Whole Tree	7	EA	1 per structure
Small Woody Debris	21	CY	3 CY per structure
Racking Material	21	EA	3 per structure
Channel Spanning Jam	0	EA	None
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Wood Habitat Structure	2	EA	1 every 8 channel meander wave lengths
Log with Rootwad	7	EA	4 per structure
Small Woody Debris	5	CY	3 CY per structure
Racking Material	5	EA	3 per structure
Turning Log Structure	1	EA	1 every 16 channel meander wave lengths
Log with Rootwad	4	EA	4 per structure
Small Woody Debris	3	CY	3 CY per structure
Racking Material	3	EA	3 per structure
Boulders	2	EA	2 per structure
Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	10 per Alcove
Oxbow Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	25 per Alcove
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre, intended for anually wet areas
Zone 2	197	EA	4840 plants per acre
Zone 3	156	EA	3825 plants per acre
Zone 4	385	EA	1891 plants per acre
Seeding			
Zone 2	0.04	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.04	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	0.20	AC	5' width each side of channel; 19.02 pure live seed/AC

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MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Midnight Creek - Yellow Pine Pit - Reach MNC2
Valley County, Idaho

Draft

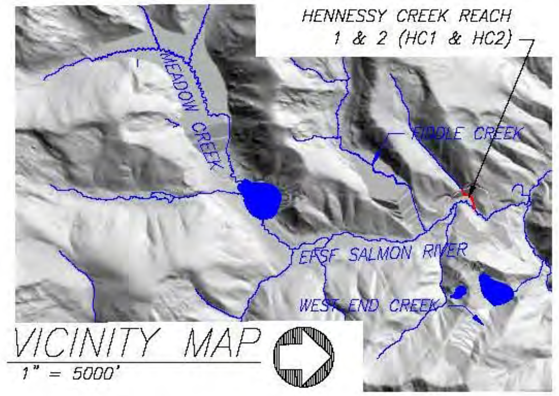
Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: ---

Drawing Name
MNC2 Quantities

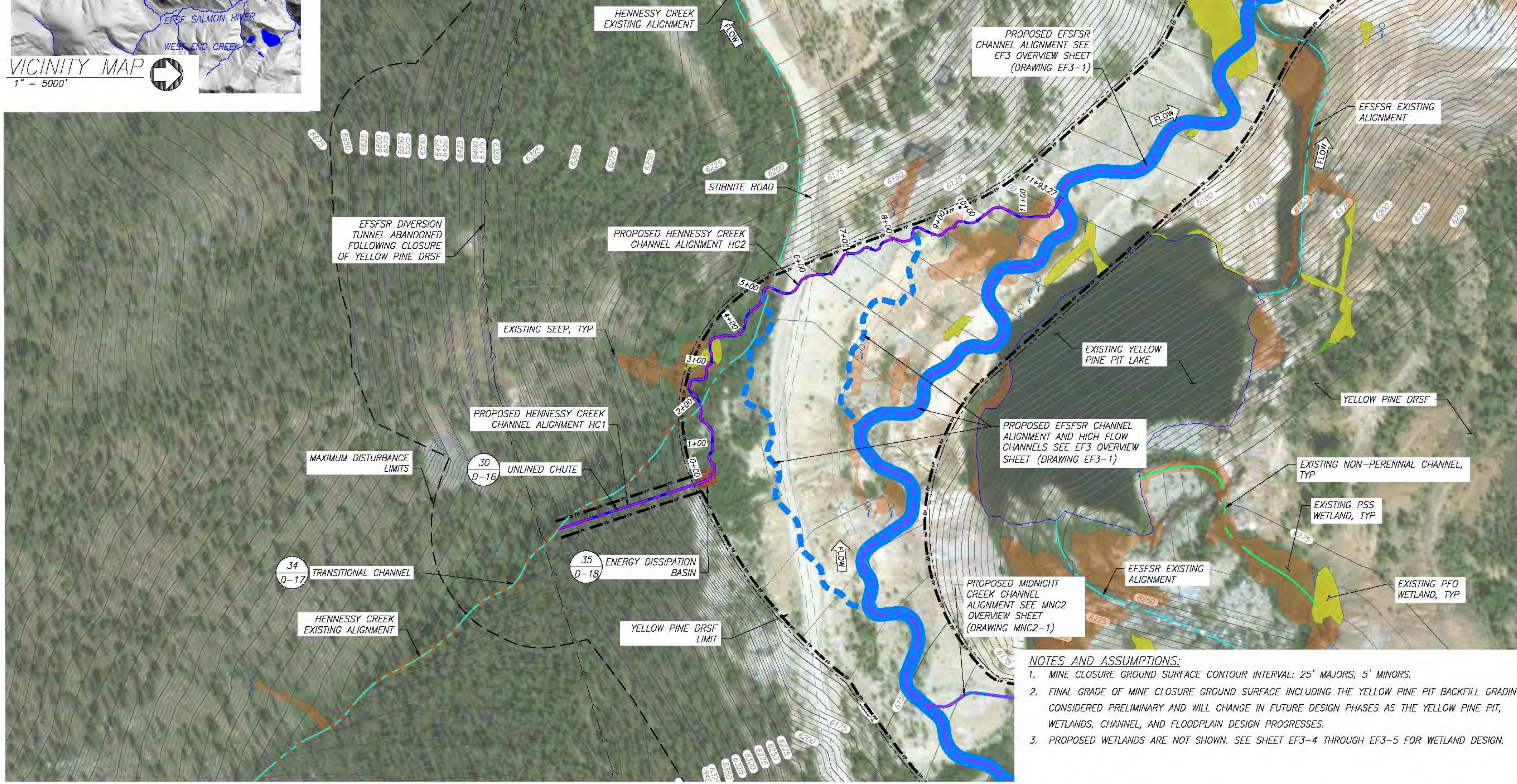
Drawing No.
MNC2-3

HC1 & HC2 PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	CHANNEL SLOPE (%)
HC1	287	287	1.0	95.82	95.82
HC2	1,000	1,193	1.2	4.45	3.76

HC1 & HC2 PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
HC1	287	0
HC2	1,193	0



VICINITY MAP
1" = 5000'



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE INCLUDING THE YELLOW PINE PIT BACKFILL GRADING IS CONSIDERED PRELIMINARY AND WILL CHANGE IN FUTURE DESIGN PHASES AS THE YELLOW PINE PIT, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. PROPOSED WETLANDS ARE NOT SHOWN. SEE SHEET EF3-4 THROUGH EF3-5 FOR WETLAND DESIGN.

0 200 400 Feet

HENNESSY CREEK REACH 1 & 2 – RESTORATION REACH SITE OVERVIEW PLAN

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Boise, Idaho 83705

MIDAS GOLD

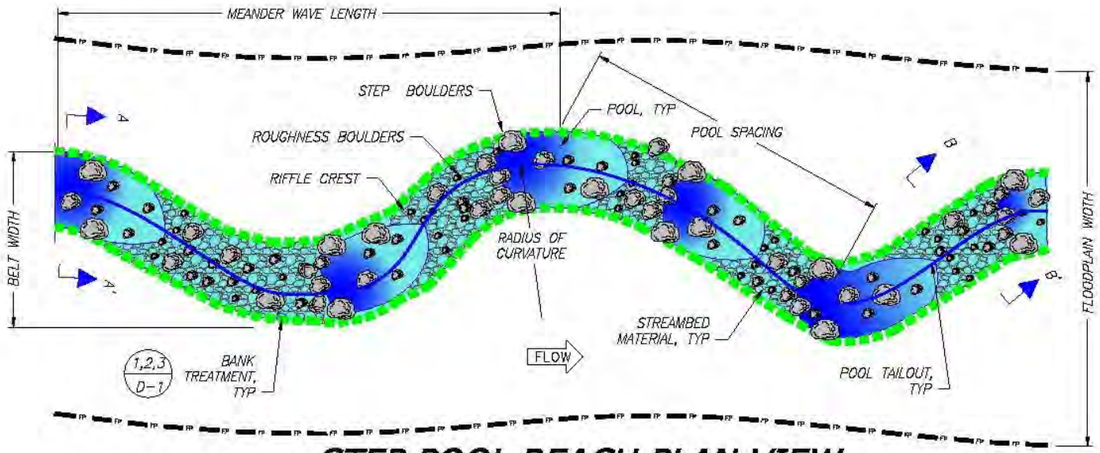
Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Hennessy Creek - Yellow Pine Pit - Reach HC1&2
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: --

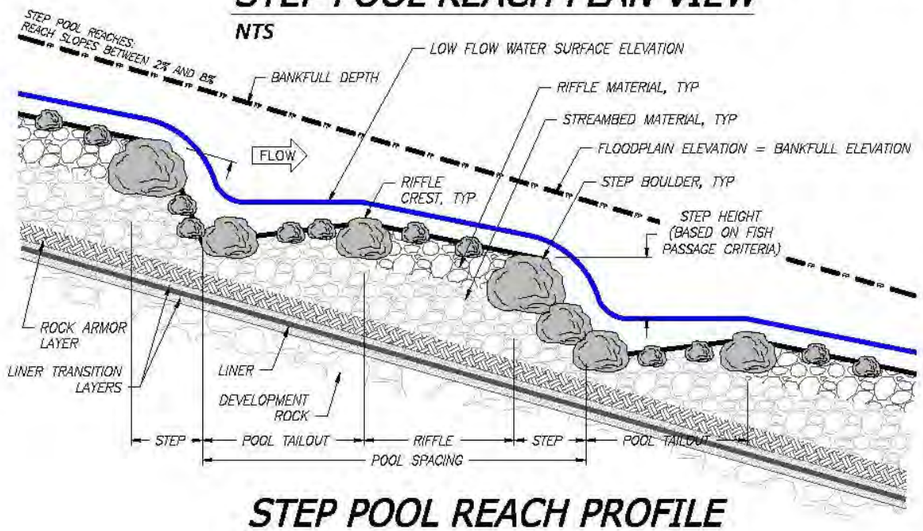
Drawing Name
HC1&2 Overview Sheet

Drawing No.
HC1&2-1



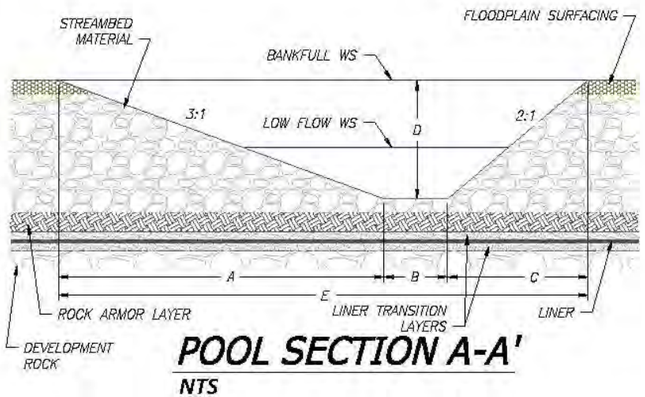
STEP POOL REACH PLAN VIEW

NTS



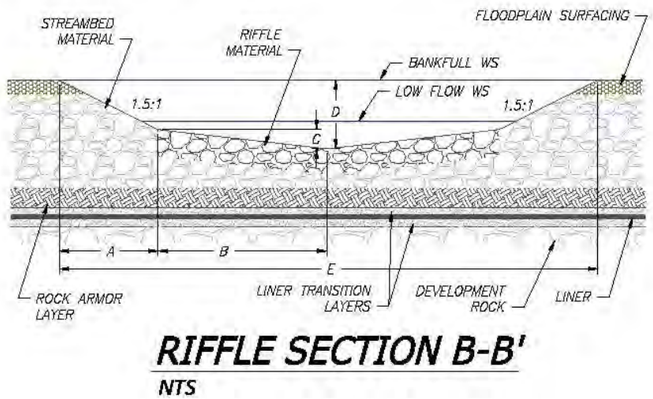
STEP POOL REACH PROFILE

NTS



POOL SECTION A-A'

NTS



RIFFLE SECTION B-B'

NTS

NOTES

1. CHANNEL AND FLOODPLAIN SHALL BE CONSTRUCTED TO THE DIMENSIONS IDENTIFIED IN THE CHANNEL DEFINITION TABLES AND AT THE LOCATIONS SHOWN IN INDIVIDUAL REACH OVERVIEW PLAN SHEETS.
2. CHANNEL SIZING FOR TYPICAL POOL AND RIFFLE CROSS SECTIONS IS BASED ON CHANNEL FORMING (BANKFULL) DESIGN FLOW. DETAILED TYPICAL SECTIONS FOR OTHER STREAM HABITATS WILL BE DEVELOPED IN A FUTURE DESIGN PHASE.
3. BANK TREATMENT TYPES ARE NOT DEPICTED IN THE TYPICAL POOL AND RIFFLE SECTIONS. SEE SHEETS D-1 AND D-2 FOR BANK TREATMENT DETAILS.
4. SEE SHEETS D-3 THROUGH D-10 FOR HABITAT STRUCTURE DETAILS.
5. HABITAT STRUCTURE SPACING AND ASSOCIATED QUANTITIES ARE SUMMARIZED IN INDIVIDUAL REACH QUANTITY SHEETS.
6. SEE SHEETS D-1 AND D-20 FOR PLANTING AND SEEDING DETAILS AND PLANTING SCHEDULES.
7. SEE SHEETS D-13 THROUGH D-14 FOR TYPICAL FLOODPLAIN CROSS SECTIONS.
2. ROCK ARMOR LAYER TO SPAN CHANNEL WIDTH, AS SHOWN, CONTINUOUSLY ALONG LONGITUDINAL PROFILE.
3. ROCK ARMOR LAYER TO SPAN VALLEY WIDTH, AS SHOWN, AT STRATEGIC LOCATIONS (TBD) ALONG LONGITUDINAL PROFILE.

HC2 – STEP POOL REACH
PROPOSED CHANNEL DEFINITION TABLES

PLAN TABLE									
REACH ID	BANKFULL FLOW (CFS)	BANKFULL WIDTH (FT)	WIDTH/ DEPTH RATIO	AVERAGE DEPTH AT BANKFULL (FT)	MEANDER WAVELENGTH (FT)	MEANDER BELT WIDTH (FT)	RADIUS OF CURVATURE (FT)	AVG POOL SPACING (FT)	FLOODPLAIN WIDTH (FT)
HC2	6	5	8	0.6	45-55	20-35	5-30	20-55	NA

PROFILE TABLE				
REACH ID	RIFFLE LENGTH (FT)	POOL LENGTH (FT)	POOL ENTRANCE SLOPE (%)	POOL TAILOUT SLOPE (%)
HC2	5-55	5-10	41-45	20-49

MATERIALS TABLE								
REACH ID	STREAMBED MATERIAL TYPE	STREAMBED MATERIAL AVG THICKNESS (FT)	RIFFLE MATERIAL TYPE	RIFFLE MATERIAL AVG THICKNESS (FT)	FLOODPLAIN MATERIAL TYPE	FLOODPLAIN MATERIAL AVG THICKNESS (FT)	FLOODPLAIN SURFACING TYPE	FLOODPLAIN SURFACING AVG THICKNESS (FT)
HC2								

NOTES

1. MATERIALS TABLE TO BE DEVELOPED IN FUTURE DESIGN.
2. STREAMBED MATERIAL TYPES: S1 (D50 = XX"), S2 (D50 = XX"), S3 (D50 = XX").
3. RIFFLE MATERIAL TYPES: S1, S2, S3, R1 (D50 = XX"), R2 (D50 = XX").
4. FLOODPLAIN SURFACING MATERIAL TYPES: GROWTH MEDIA, ALGAE, HYDROMULCH, OR NONE.

SECTIONS TABLE					
SECTION	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)
POOL SECTION A-A'	3.0	-0.9	3.0	1.5	5.1
RIFFLE SECTION B-B'	1.1	2.0	0.1	0.8	4.6

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MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Hennessy Creek - Yellow Pine Pit - Reach HC1&2
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: --

Drawing Name
HC1&2 Typical Plan and Profile

Drawing No.
HC1&2-2

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Low complexity of diversion channel, or pump and pipe (cleaner)
Stormwater Management			
BMPs and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	Low complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	435	CY	Channel Length * Top Width * (Depth + D100)
Floodplain Excavation (Cut)	0	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	0	CY	
Engineered Streambed Material [3]	96	CY	Channel Length * Top Width * (DepthD100)
Sorting and Stockpiling [3]	96	CY	
Rock Armoring/ Grade Control [3]	0	CY	
Ephemeral Swale Channel Material	0	CY	
General Fill	0	CY	
Filter Material	0	CY	
Topsoil/ Growth Media [3]	442	CY	6" thickness in Zone 3
Liner	0	SF	
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	0	LF	Assumes 0% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	0	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	0	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	477	LF	Assumes 20% of total length of bank treatment
Brushlayer Live Cuttings	954	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	134	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	1,432	LF	Assumes 60% of total length of bank treatment
Brushlayer Live Cuttings	2,863	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	200	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	24	EA	1 per step pool
Riffle Material	177	CY	No. of riffles x 20' length x 10' width; 1ft thickness
Energy Dissipation Pool	0	EA	None
Boulders	0	EA	Based on bankfull width
Dissipation Pool Streambed Material	0	CY	Based on bankfull width, length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	3	EA	1 every 8 channel meander wave lengths
Foundation Logs	0	EA	0 per structure
Log with Rootwad	9	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	6	CY	2 CY per structure
Racking Material	6	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	13	EA	1 per 90 linear feet of new channel
Log with Rootwad	13	EA	1 per structure
Retaining Log	13	EA	1 per structure
Tight Radius Jam Structure	2	EA	1 every 10 channel meander wave lengths
Foundation Logs	17	EA	3 per structure
Log with Rootwad	14	EA	3 per structure
Small Woody Debris	31	CY	7 CY per structure
Racking Material	33	EA	7 per structure
Bend Jam Structure	4	EA	1 every 6 channel meander wave lengths
Foundation Logs	8	EA	2 per structure
Log with Rootwad	12	EA	3 per structure
Whole Tree	8	EA	1 per structure
Small Woody Debris	52	CY	13 CY per structure
Racking Material	60	EA	15 per structure
Sweeper Log Structure	5	EA	1 every 5 channel meander wave lengths
Whole Tree	5	EA	1 per structure
Small Woody Debris	14	CY	3 CY per structure
Racking Material	14	EA	3 per structure
Channel Spanning Jam	0	EA	None
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Wood Habitat Structure	4	EA	1 every 6 channel meander wave lengths
Log with Rootwad	16	EA	4 per structure
Small Woody Debris	12	CY	3 CY per structure
Racking Material	12	EA	3 per structure
Turning Log Structure	2	EA	1 every 10 channel meander wave lengths
Log with Rootwad	10	EA	4 per structure
Small Woody Debris	7	CY	3 CY per structure
Racking Material	7	EA	3 per structure
Boulders	5	EA	2 per structure
Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	10 per Alcove
Oxbow Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	25 per Alcove
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre, Intended for anually wet areas
Zone 2	265	EA	4840 plants per acre
Zone 3	210	EA	3825 plants per acre
Zone 4	518	EA	1891 plants per acre
Seeding			
Zone 2	0.05	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.05	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	0.27	AC	5' width each side of channel; 19.02 pure live seed/AC

Applied Science & Engineering
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Boise, Idaho 83705

MIDAS GOLD

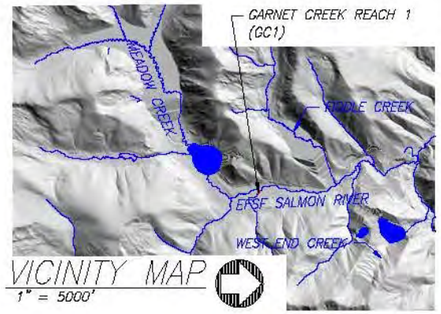
Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Hennessy Creek - Yellow Pine Pit - Reach HC1&2
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: ---

Drawing Name
HC1&2 Quantities

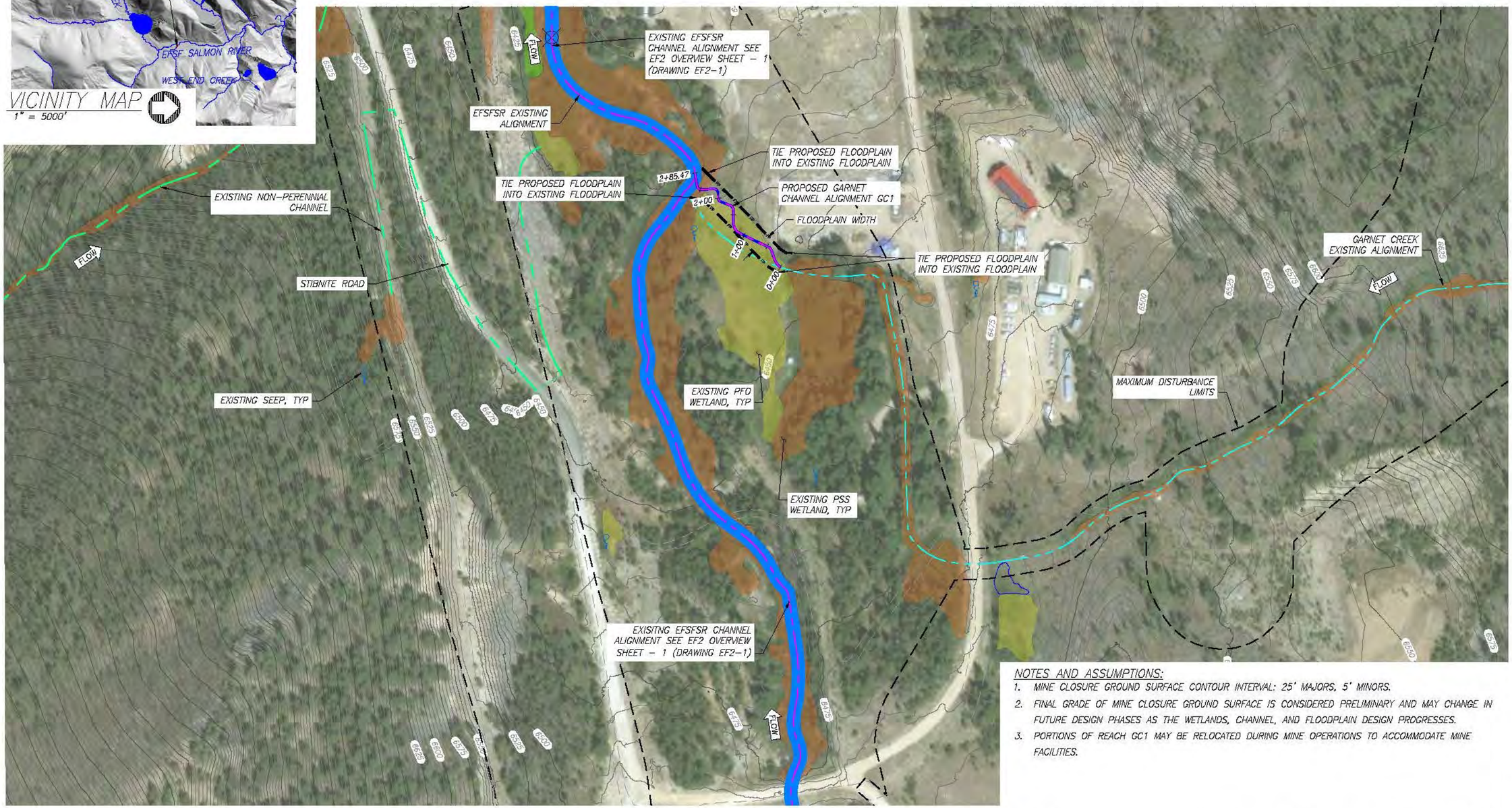
Drawing No.
HC1&2-3



VICINITY MAP
1" = 5000'

GC1 PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
GC1	249	285	1.1	1.20	1.05

GC1 PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
GC1	285	0



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. PORTIONS OF REACH GC1 MAY BE RELOCATED DURING MINE OPERATIONS TO ACCOMMODATE MINE FACILITIES.

0 200 400 Feet

GARNET CREEK REACH 1 – RESTORATION REACH SITE OVERVIEW PLAN

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2449 S. Vista Ave. Suite B
Boise, Idaho 83705

MIDAS GOLD

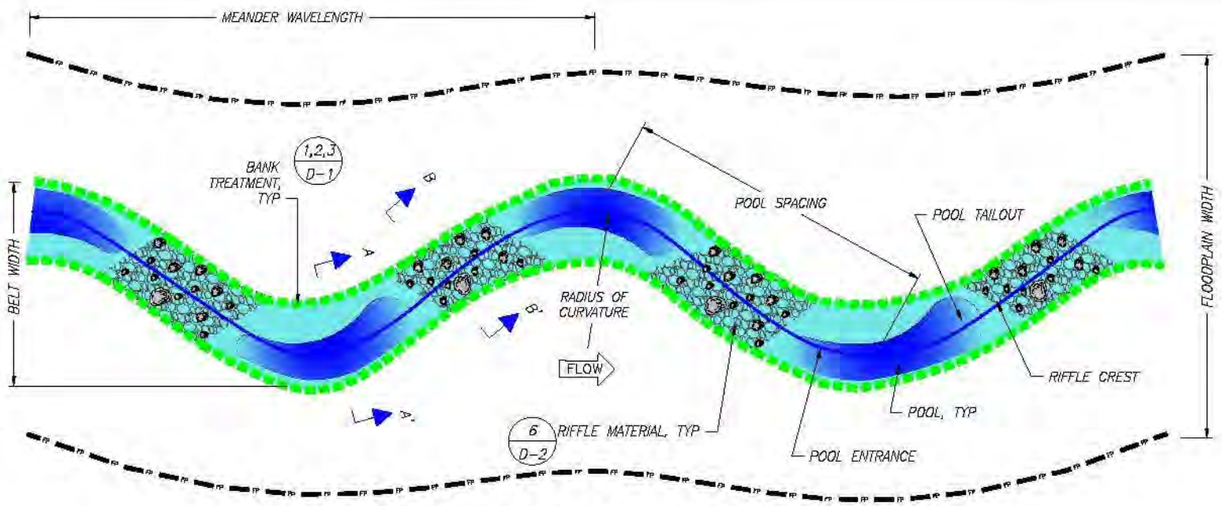
Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Garnet Creek - Processing Facility - Reach GC1
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: ---

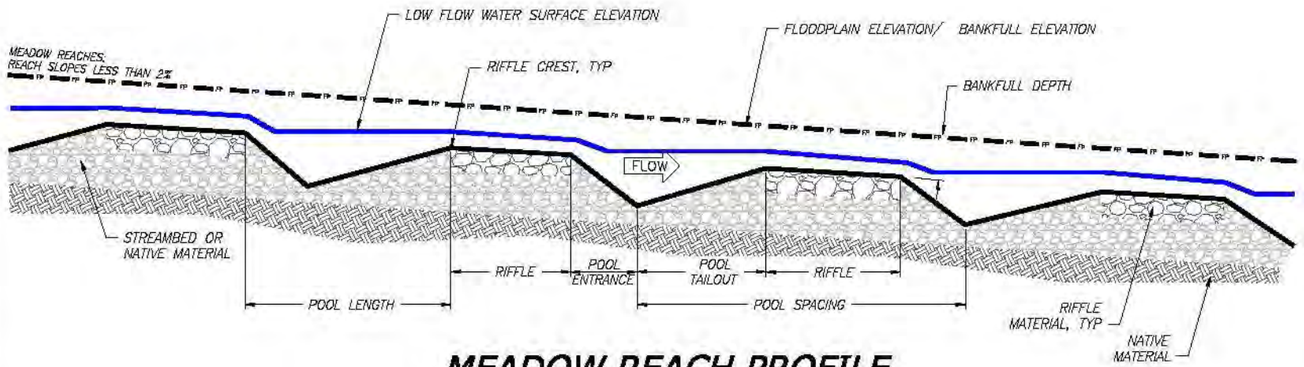
Drawing Name
GC1 Overview Sheet

Drawing No.
GC1–1



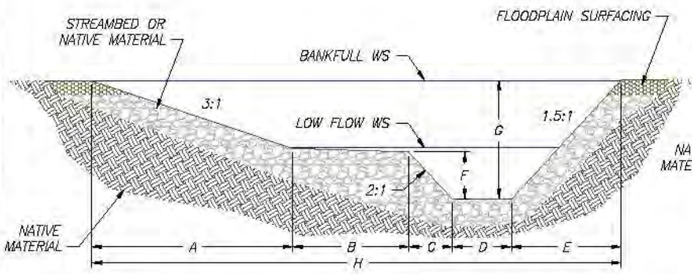
MEADOW REACH PLAN VIEW

NTS



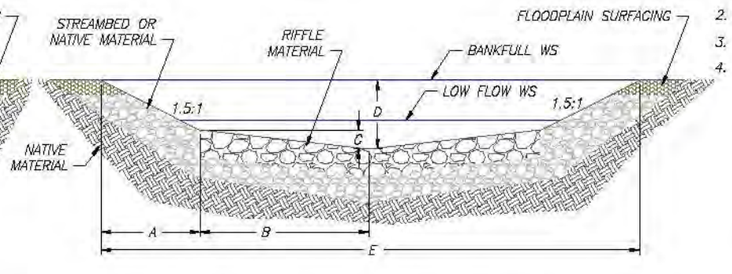
MEADOW REACH PROFILE

NTS



POOL SECTION A-A'

NTS



RIFFLE SECTION B-B'

NTS

NOTES

1. CHANNEL AND FLOODPLAIN SHALL BE CONSTRUCTED TO THE DIMENSIONS IDENTIFIED IN THE CHANNEL DEFINITION TABLES AND AT THE LOCATIONS SHOWN IN INDIVIDUAL REACH OVERVIEW PLAN SHEETS.
2. CHANNEL SIZING FOR TYPICAL POOL AND RIFFLE CROSS SECTIONS IS BASED ON CHANNEL FORMING (BANKFULL) DESIGN FLOW. DETAILED TYPICAL SECTIONS FOR OTHER STREAM HABITATS WILL BE DEVELOPED IN A FUTURE DESIGN PHASE.
3. BANK TREATMENT TYPES ARE NOT DEPICTED IN THE TYPICAL POOL AND RIFFLE SECTIONS. SEE SHEETS D-1 AND D-2 FOR BANK TREATMENT DETAILS.
4. SEE SHEETS D-3 THROUGH D-10 FOR HABITAT STRUCTURE DETAILS.
5. HABITAT STRUCTURE SPACING AND ASSOCIATED QUANTITIES ARE SUMMARIZED IN INDIVIDUAL REACH QUANTITY SHEETS.
6. SEE SHEETS D-1 AND D-20 FOR PLANTING AND SEEDING DETAILS AND PLANTING SCHEDULES.
7. SEE SHEETS D-13 THROUGH D-14 FOR TYPICAL FLOODPLAIN CROSS SECTIONS.

GC1 – STEP POOL REACH
PROPOSED CHANNEL DEFINITION TABLES

PLAN TABLE

REACH ID	BANKFULL FLOW (CFS)	BANKFULL WIDTH (FT)	WIDTH/ DEPTH RATIO	AVERAGE DEPTH AT BANKFULL (FT)	MEANDER WAVELENGTH (FT)	MEANDER BELT WIDTH (FT)	RADIUS OF CURVATURE (FT)	AVG POOL SPACING (FT)	FLOODPLAIN WIDTH (FT)
GC1	5	5	12	0.4	50-65	25-20	10-30	20-65	20-40

PROFILE TABLE

REACH ID	RIFFLE LENGTH (FT)	POOL LENGTH (FT)	POOL ENTRANCE SLOPE (%)	POOL TAILOUT SLOPE (%)
GC1	10-60	5-15	24-45	12-28

MATERIALS TABLE

REACH ID	STREAMBED MATERIAL TYPE	STREAMBED MATERIAL AVG THICKNESS (FT)	RIFFLE MATERIAL TYPE	RIFFLE MATERIAL AVG THICKNESS (FT)	FLOODPLAIN MATERIAL TYPE	FLOODPLAIN MATERIAL AVG THICKNESS (FT)	FLOODPLAIN SURFACING TYPE	FLOODPLAIN SURFACING AVG THICKNESS (FT)
GC1								

NOTES

1. MATERIALS TABLE TO BE DEVELOPED IN FUTURE DESIGN.
2. STREAMBED MATERIAL TYPES: S1 (D50 = XX"), S2 (D50 = XX"), S3 (D50 = XX").
3. RIFFLE MATERIAL TYPES: S1, S2, S3, R1 (D50 = XX"), R2 (D50 = XX").
4. FLOODPLAIN SURFACING MATERIAL TYPES: GROWTH MEDIA, ALGAE, HYDROMULCH, OR NONE.

SECTIONS TABLE

SECTION	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)
POOL SECTION A-A'	2.0	1.8	2.0	1.0	5.8
RIFFLE SECTION B-B'	0.6	2.0	0.2	0.6	5.3

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MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Garnet Creek - Processing Facility - Reach GC1
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: ---

Drawing Name
GC1 Typical Plan and Profile

Drawing No.
GC1-2

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Low complexity of diversion channel, or pump and pipe (cleaner)
Stormwater Management			
BMPs and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	Low complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	0	CY	
Floodplain Excavation (Cut)	0	CY	
Excavation (Fill)			
Channel Excavation (Fill)	0	CY	
Floodplain Excavation (Fill)	0	CY	
Engineered Streambed Material	81	CY	285 LF of new channel;1 FT streambed thickness;12 SF XS
Sorting and Stockpiling Material	81	CY	Includes both Engineered Streambed Material and Rock Armoring
Rock Armoring/ Grade Control	0	CY	
Ephemeral Swale Channel Material	0	CY	
General Fill	26	CY	General fillI for filling existing channel
Filter Material	0	CY	
Topsoil/ Growth Media	106	CY	12" thickness in Zone 3
Liner	0	SF	
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	285	LF	Assumes 50% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	570	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	570	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	190	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	1,140	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	86	LF	Assumes 15% of total length of bank treatment
Brushlayer Live Cuttings	171	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	24	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	86	LF	Assumes 15% of total length of bank treatment
Brushlayer Live Cuttings	171	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	12	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	10	EA	2 per channel meander wave length
Riffle Material	74	CY	No. of riffles x 20' length x 10' width; 1ft thickness
Energy Dissipation Pool	0	EA	None
Boulders	0	EA	Based on bankfull width
Dissipation Pool Streambed Material	0	CY	Based on bankfull width; length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	1	EA	1 every 8 channel meander wave lengths
Foundation Logs	0	EA	0 per structure
Log with Rootwad	2	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	1	CY	2 CY per structure
Racking Material	1	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	4	EA	1 per 70 linear feet of new channel
Log with Rootwad	4	EA	1 per structure
Retaining Log	4	EA	1 per structure
Tight Radius Jam Structure	1	EA	1 every 8 channel meander wave lengths
Foundation Logs	4	EA	3 per structure
Log with Rootwad	4	EA	3 per structure
Small Woody Debris	8	CY	7 CY per structure
Racking Material	9	EA	7 per structure
Bend Jam Structure	1	EA	1 every 9 channel meander wave lengths
Foundation Logs	1	EA	2 per structure
Log with Rootwad	2	EA	3 per structure
Whole Tree	1	EA	1 per structure
Small Woody Debris	7	CY	13 CY per structure
Racking Material	8	EA	15 per structure
Sweeper Log Structure	3	EA	1 every 2 channel meander wave lengths
Whole Tree	3	EA	1 per structure
Small Woody Debris	8	CY	3 CY per structure
Racking Material	8	EA	3 per structure
Channel Spanning Jam	0	EA	None
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Wood Habitat Structure	1	EA	1 every 4 channel meander wave lengths
Log with Rootwad	5	EA	4 per structure
Small Woody Debris	4	CY	3 CY per structure
Racking Material	4	EA	3 per structure
Turning Log Structure	1	EA	1 every 8 channel meander wave lengths
Log with Rootwad	3	EA	4 per structure
Small Woody Debris	2	CY	3 CY per structure
Racking Material	2	EA	3 per structure
Boulders	1	EA	2 per structure
Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	10 per Alcove
Oxbow Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	25 per Alcove
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre, intended for anually wet areas
Zone 2	63	EA	4840 plants per acre
Zone 3	50	EA	3825 plants per acre
Zone 4	124	EA	1891 plants per acre
Seeding			
Zone 2	0.01	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.01	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	0.07	AC	5' width each side of channel; 19.02 pure live seed/AC

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MIDAS GOLD

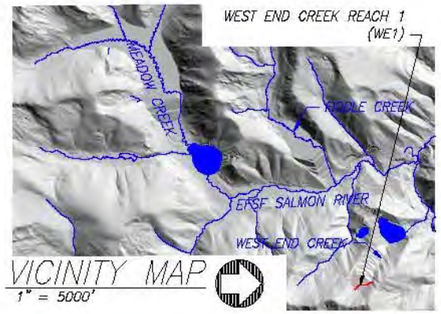
Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Garnet Creek - Processing Facility - Reach GC1
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: —

Drawing Name
GC1 Quantities

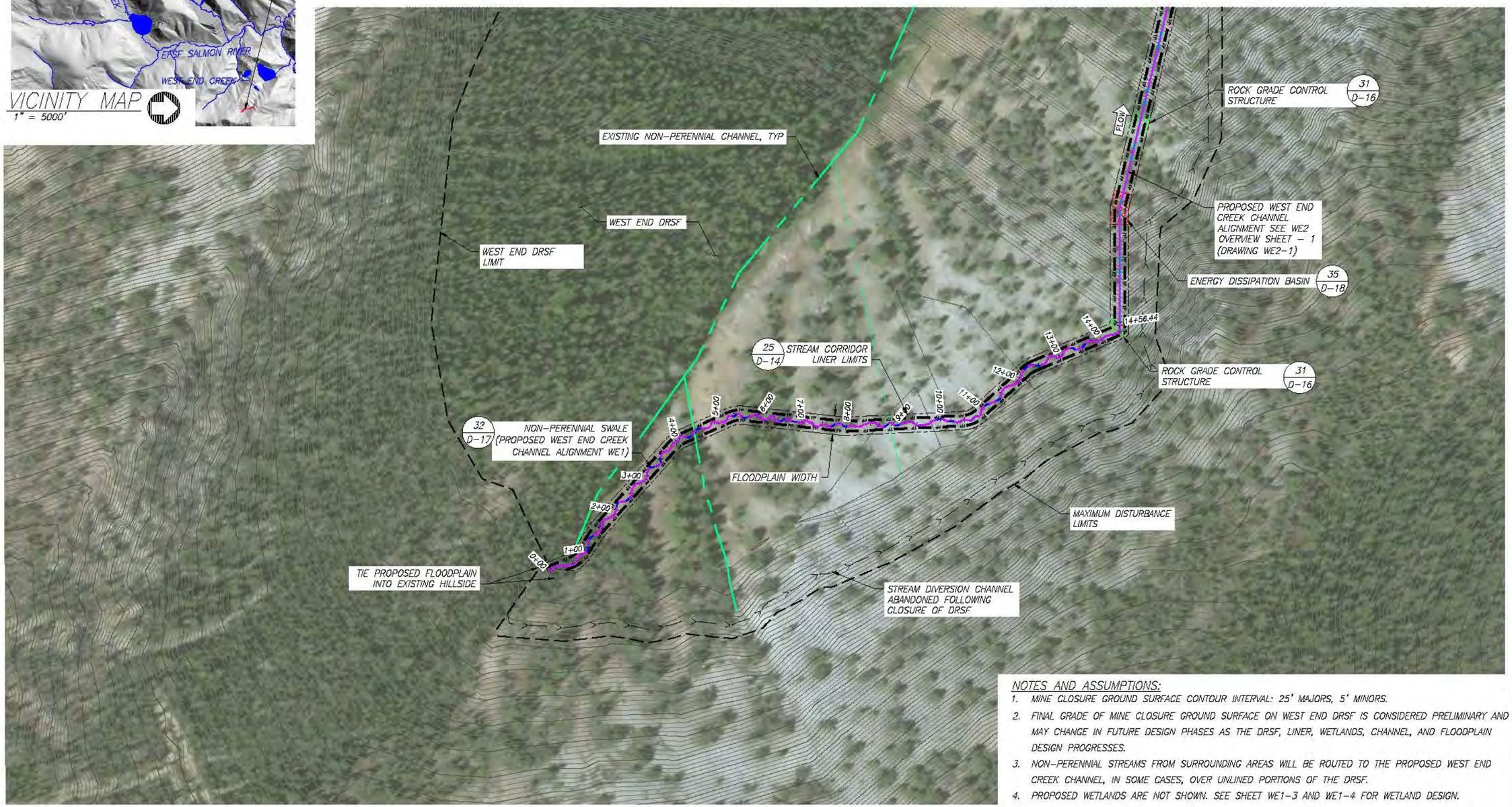
Drawing No.
GC1-3



VICINITY MAP
1" = 5000'

WE1 PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
WE1	**1,307**	**1,456**	**1.1**	**0.33**	**0.30**

WE1 PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
WE1	**0**	**1,456**



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON WEST END DRSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE DRSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. NON-PERENNIAL STREAMS FROM SURROUNDING AREAS WILL BE ROUTED TO THE PROPOSED WEST END CREEK CHANNEL, IN SOME CASES, OVER UNLINED PORTIONS OF THE DRSF.
4. PROPOSED WETLANDS ARE NOT SHOWN. SEE SHEET WE1-3 AND WE1-4 FOR WETLAND DESIGN.

0 200 400 Feet

WEST END CREEK REACH 1 - RESTORATION REACH
SITE OVERVIEW PLAN

Applied Science & Engineering
2449 S. Vista Ave. Suite B
Boise, Idaho 83705

MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
West End Creek - West End DRSF - WE1
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: --

Drawing Name
WE1 Overview Sheet

Drawing No.
WE1-1

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Low complexity of diversion channel, or pump and pipe (cleaner)
Stormwater Management			
BMP's and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	Medium complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	0	CY	
Floodplain Excavation (Cut)	0	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	0	CY	
Engineered Streambed Material [3]	647	CY	1456 LF of new channel,1 FT streambed thickness,12 SF XS
Sorting and Stockpiling [3]	1,730	CY	Includes both Engineered Stream Bed Material and Rock Armoring
Rock Armoring/ Grade Control [3]	1,730	CY	
Ephemeral Swale Channel Material [3]	0	CY	
General Fill	0	CY	
Filter Material	3,461	CY	
Topsoil/ Growth Media [3]	1,730	CY	
Liner	46,722	SF	Includes all material and labor
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	0	LF	Assumes 0% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	0	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	0	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	0	LF	Assumes 0% of total length of bank treatment
Brushlayer Live Cuttings	0	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	0	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	0	LF	Assumes 0% of total length of bank treatment
Brushlayer Live Cuttings	0	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	0	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	0	EA	None
Riffle Material	0	CY	No. of riffles x 20' length x 10' width, 1ft thickness
Energy Dissipation Pool	0	EA	None
Boulders	0	EA	Based on bankfull width
Dissipation Pool Streambed Material	0	CY	Based on bankfull width, length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	0	EA	None
Foundation Logs	0	EA	0 per structure
Log with Rootwad	0	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	0	CY	2 CY per structure
Racking Material	0	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	0	EA	None
Log with Rootwad	0	EA	1 per structure
Retaining Log	0	EA	1 per structure
Tight Radius Jam Structure	0	EA	None
Foundation Logs	0	EA	3 per structure
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	7 CY per structure
Racking Material	0	EA	7 per structure
Bend Jam Structure	0	EA	None
Foundation Logs	0	EA	2 per structure
Log with Rootwad	0	EA	3 per structure
Whole Tree	0	EA	1 per structure
Small Woody Debris	0	CY	13 CY per structure
Racking Material	0	EA	15 per structure
Sweeper Log Structure	0	EA	None
Whole Tree	0	EA	1 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Channel Spanning Jam	0	EA	None
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Wood Habitat Structure	0	EA	None
Log with Rootwad	0	EA	4 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Turning Log Structure	0	EA	None
Log with Rootwad	0	EA	4 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Boulders	0	EA	2 per structure
Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	10 per Alcove
Oxbow Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	25 per Alcove
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre, intended for anually wet areas
Zone 2	324	EA	4840 plants per acre
Zone 3	256	EA	3825 plants per acre
Zone 4	632	EA	1891 plants per acre
Seeding			
Zone 2	0.07	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.07	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	0.33	AC	5' width each side of channel; 19.02 pure live seed/AC

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MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
West End Creek - West End DRSF - WE1
Valley County, Idaho

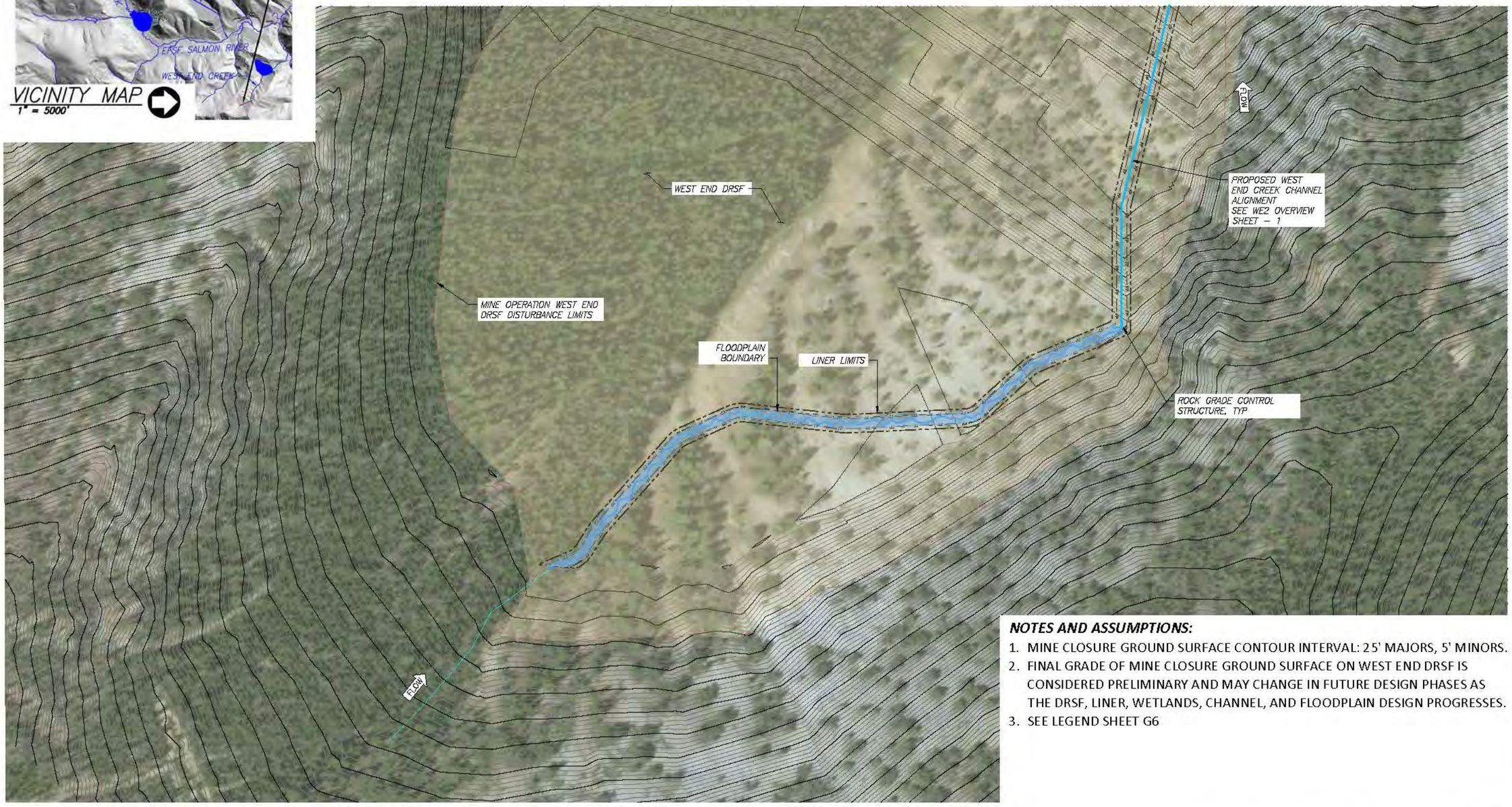
Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: —

Drawing Name
WE1 Quantities

Drawing No.
WE1-2

VICINITY MAP
1" = 5000'



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON WEST END DRSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE DRSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. SEE LEGEND SHEET G6

WEST END CREEK REACH 1 WETLANDS OVERVIEW PLAN

0 200

TETRA TECH

MIDAS GOLD

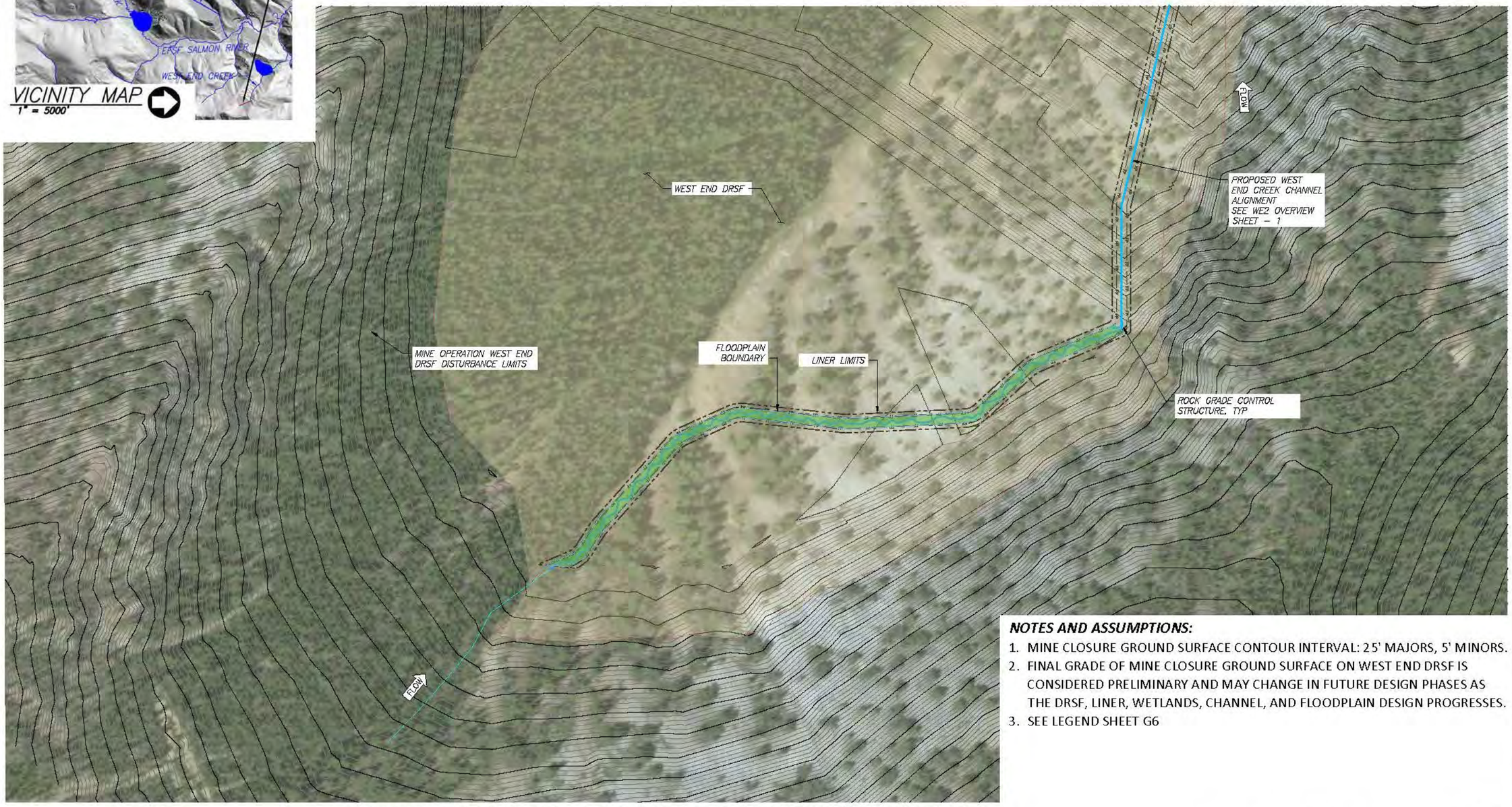
Draft

Date: 5-16-2018
Designed: LC, JHD
Drawn: JHD
Checked: LC
Approved:

Drawing Name
WE1 Wetland Sheet

Drawing No.
WE1-3

VICINITY MAP
1" = 5000'



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON WEST END DRSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE DRSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. SEE LEGEND SHEET G6

WEST END CREEK REACH 1 WETLANDS OVERVIEW PLAN

0 200

TETRA TECH

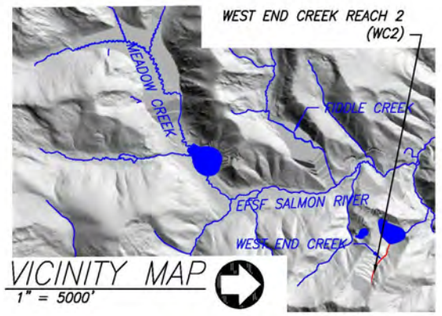
MIDAS GOLD

Draft

Date: Feb. 2019
Designed: LC, JHD
Drawn: JHD
Checked: LC
Approved: ---

Drawing Name
WE1 Wetland Planting Sheet

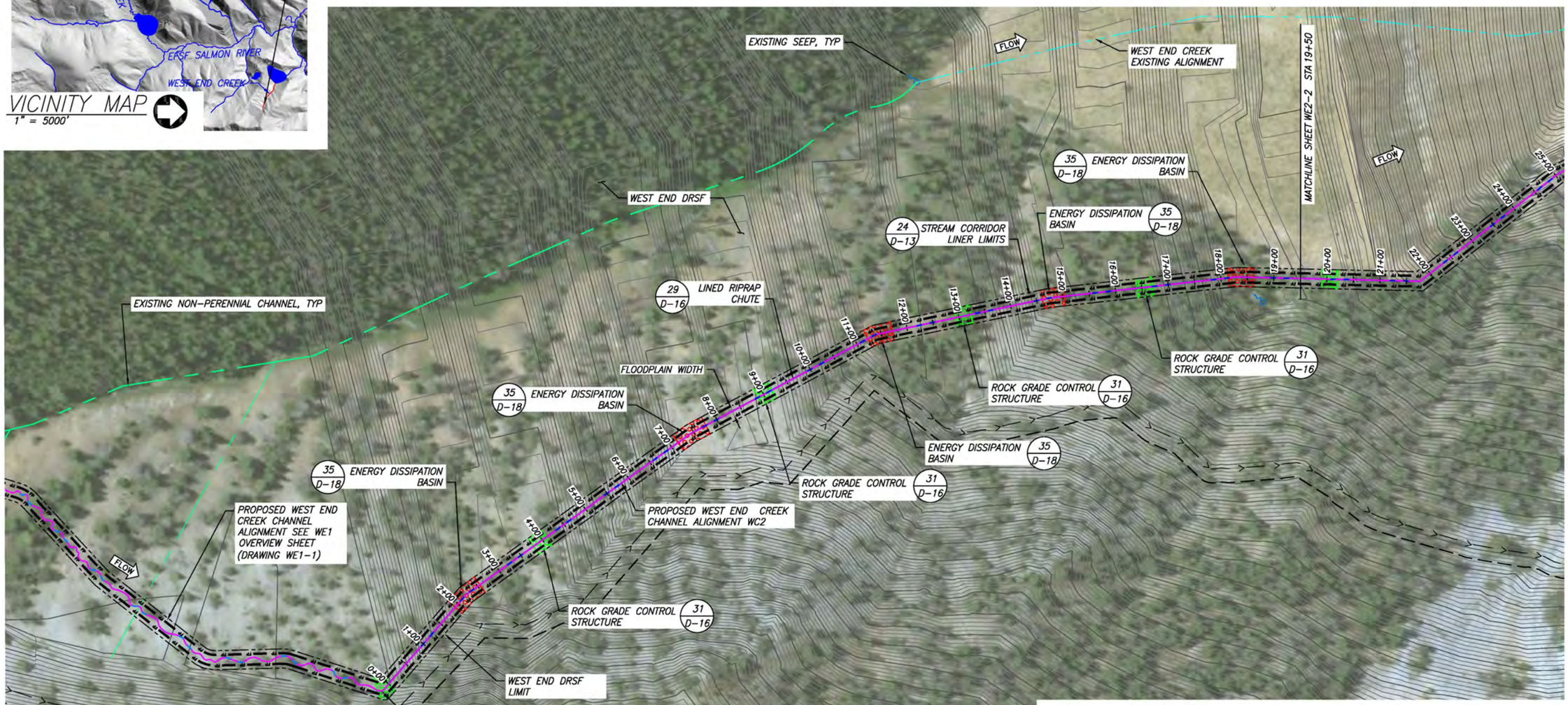
Drawing No.
WE1-4



VICINITY MAP
1" = 5000'

WE2 PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
WE2	3,025	2,923	1.0	52.09	53.91

WE2 PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
WE2	0	2,923



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON WEST END DRSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE DRSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.

WEST END CREEK REACH 2 – RESTORATION REACH SITE OVERVIEW PLAN

0 200 400 Feet

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2449 S. Vista Ave. Suite B
Boise, Idaho 83705

MIDAS GOLD

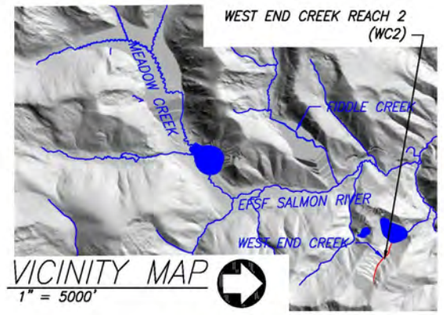
Stibnite Gold Project
Stream and Wetland Restoration Concept Design
West End Creek - West End DRSF/Pit - WE2
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: --

Drawing Name
WE2 Overview Sheet – 1

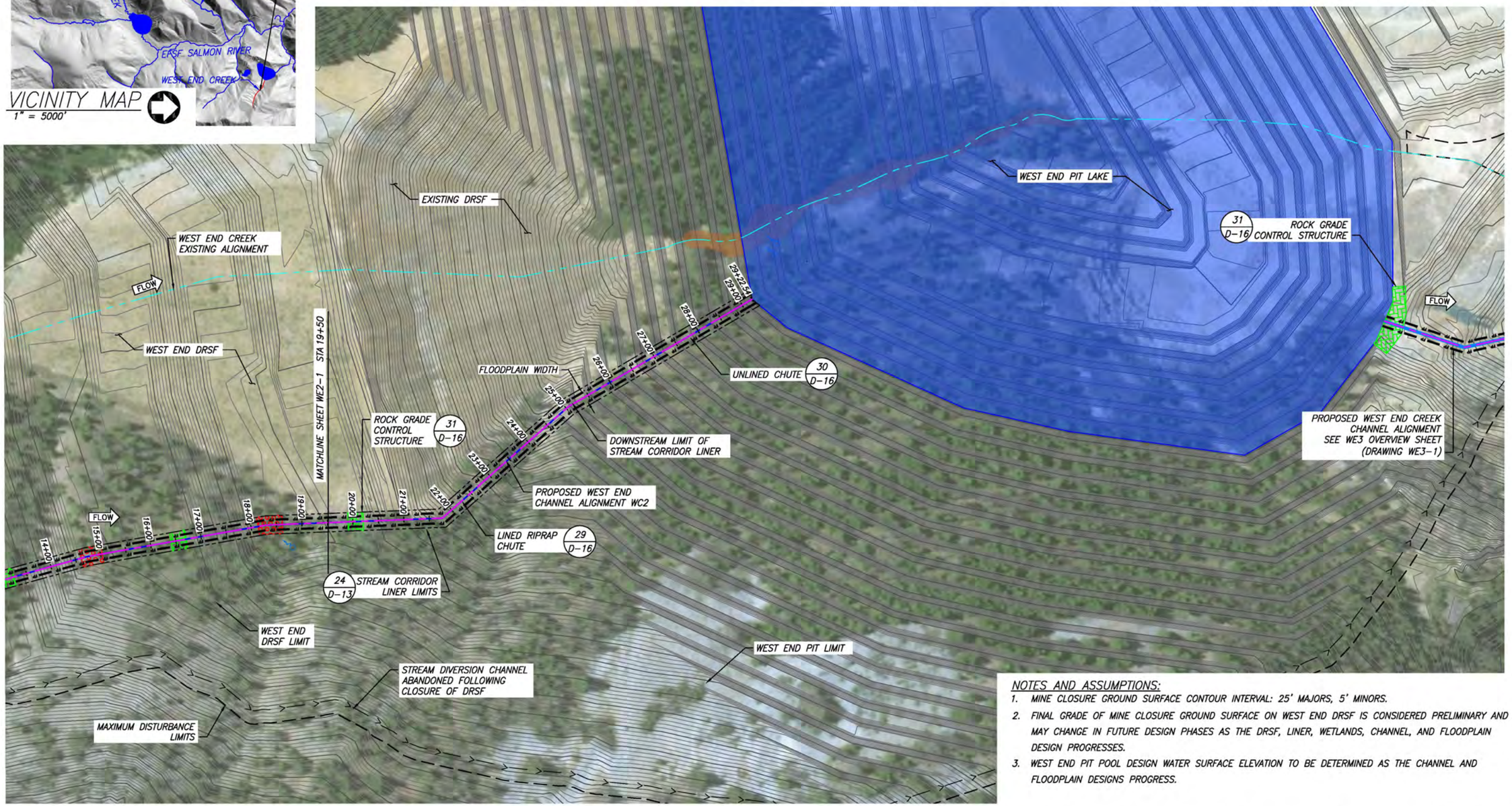
Drawing No.
WE2–1



VICINITY MAP
1" = 5000'

WE2 PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
WE2	3,025	2,923	1.0	52.09	53.91

WE2 PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
WE2	0	2,923



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON WEST END DRSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE DRSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. WEST END PIT POOL DESIGN WATER SURFACE ELEVATION TO BE DETERMINED AS THE CHANNEL AND FLOODPLAIN DESIGNS PROGRESS.

WEST END CREEK REACH 2 – RESTORATION REACH SITE OVERVIEW PLAN

0 200 400 Feet

Applied Science & Engineering
2449 S. Vista Ave. Suite B
Boise, Idaho 83705

MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Conceptual Design
West End Creek - West End DRSF/Pit - WE2
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: --

Drawing Name
WE2 Overview Sheet – 2

Drawing No.
WE2-2

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Low complexity of diversion channel, or pump and pipe (cleaner)
Stormwater Management			
BMPs and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	Medium complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	0	CY	
Floodplain Excavation (Cut)	0	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	0	CY	
Engineered Streambed Material [3]	2,505	CY	2505 LF of new channel; 3 in. streambed thickness; 3.75 SF XS
Sorting and Stockpiling [3]	5,653	CY	Includes both Engineered Stream Bed Material and Rock Armoring
Rock Armoring/ Grade Control [3]	3,148	CY	6 GCS, 2,505 LF rock armor; 2 FT streambed thickness; 44.4 SF XS
Ephemeral Swale Channel Material [3]	0	CY	
General Fill	0	CY	
Filter Material	11,818	CY	
Topsoil/ Growth Media [3]	3,679	CY	
Liner	106,358	SF	Includes all material and labor
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	0	LF	Assumes 0% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	0	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	0	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	0	LF	Assumes 0% of total length of bank treatment
Brushlayer Live Cuttings	0	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	0	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	0	LF	Assumes 0% of total length of bank treatment
Brushlayer Live Cuttings	0	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	0	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	0	EA	None
Riffle Material	0	CY	No. of riffles x 20' length x 10' width; 1ft thickness
Energy Dissipation Pool	5	EA	No. varies by reach
Boulders	338	EA	Based on bankfull width
Dissipation Pool Streambed Material	135	CY	Based on bankfull width, length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	0	EA	None
Foundation Logs	0	EA	0 per structure
Log with Rootwad	0	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	0	CY	2 CY per structure
Racking Material	0	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	0	EA	None
Log with Rootwad	0	EA	1 per structure
Retaining Log	0	EA	1 per structure
Tight Radius Jam Structure	0	EA	None
Foundation Logs	0	EA	3 per structure
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	7 CY per structure
Racking Material	0	EA	7 per structure
Bend Jam Structure	0	EA	None
Foundation Logs	0	EA	2 per structure
Log with Rootwad	0	EA	3 per structure
Whole Tree	0	EA	1 per structure
Small Woody Debris	0	CY	13 CY per structure
Racking Material	0	EA	15 per structure
Sweeper Log Structure	0	EA	None
Whole Tree	0	EA	1 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Channel Spanning Jam	0	EA	None
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Wood Habitat Structure	0	EA	None
Log with Rootwad	0	EA	4 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Turning Log Structure	0	EA	None
Log with Rootwad	0	EA	4 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Boulders	0	EA	2 per structure
Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	10 per Alcove
Oxbow Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	25 per Alcove
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre, intended for anually wet areas
Zone 2	557	EA	4840 plants per acre
Zone 3	440	EA	3825 plants per acre
Zone 4	1,087	EA	1891 plants per acre
Seeding			
Zone 2	0.12	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.12	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	0.58	AC	5' width each side of channel; 19.02 pure live seed/AC

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MIDAS GOLD

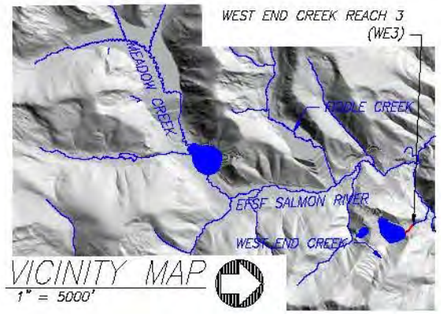
Stibnite Gold Project
Stream and Wetland Restoration Concept Design
West End Creek - West End DRSF/Pit - WE2
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JF, JY, MP
Drawn: JF, JY, MP
Checked: RR
Approved: ---

Drawing Name
WE2 Quantities

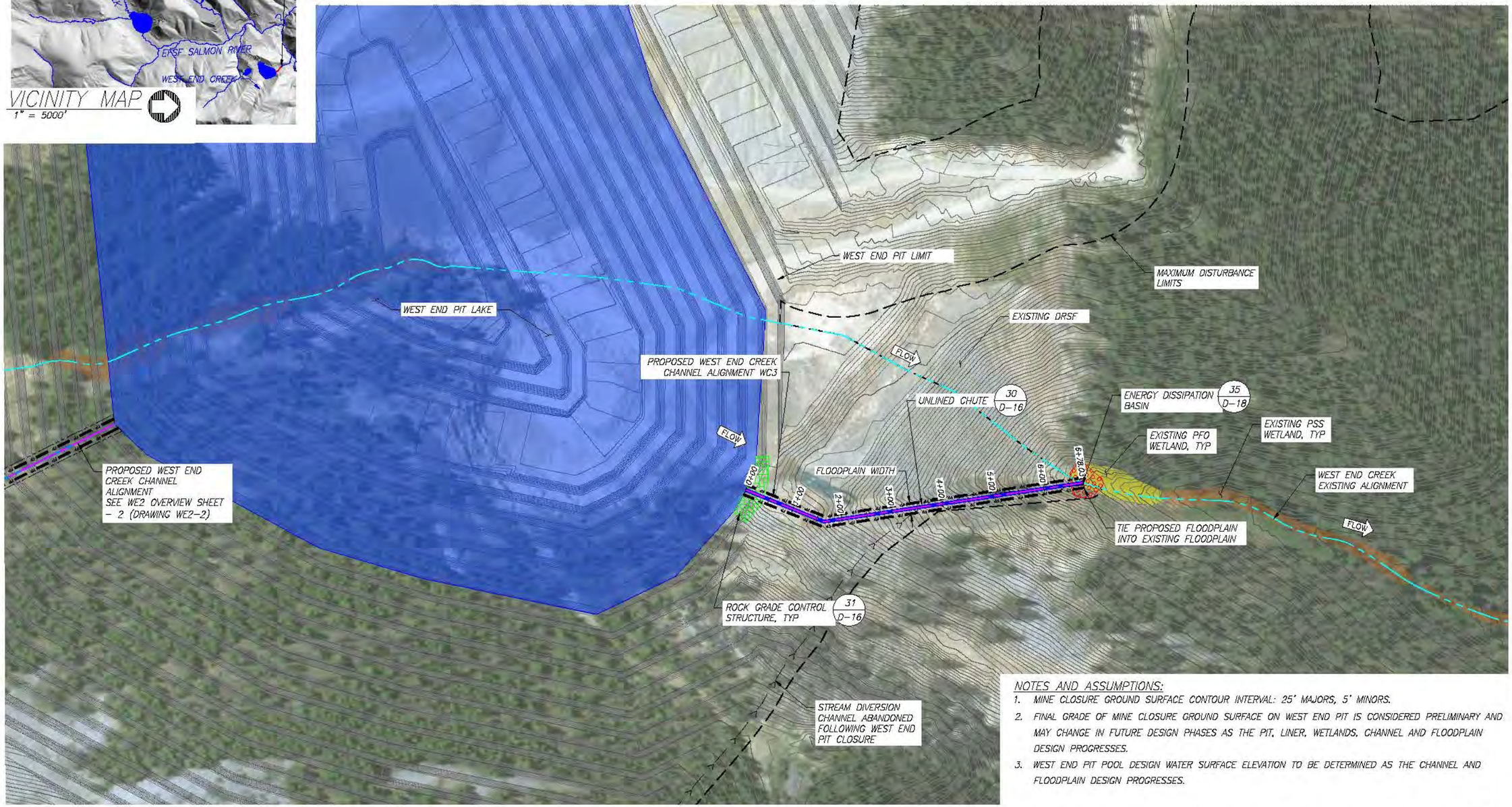
Drawing No.
WE2-3



VICINITY MAP
1" = 5000'

WE3 PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
WE3	689	678	1.0	20.38	20.71

WE3 PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
WE3	0	678



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON WEST END PIT IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE PIT, LINER, WETLANDS, CHANNEL AND FLOODPLAIN DESIGN PROGRESSES.
3. WEST END PIT POOL DESIGN WATER SURFACE ELEVATION TO BE DETERMINED AS THE CHANNEL AND FLOODPLAIN DESIGN PROGRESSES.

0 200 400 Feet

WEST END CREEK REACH 3 – RESTORATION REACH
SITE OVERVIEW PLAN

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Boise, Idaho 83705

MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
West End Creek - West End Pit - WE3
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: --

Drawing Name
WE3 Overview Sheet

Drawing No.
WE3-1

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Low complexity of diversion channel, or pump and pipe (cleaner)
Stormwater Management			
BMPs and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	Low complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	0	CY	
Floodplain Excavation (Cut)	0	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	0	CY	
Engineered Streambed Material [3]	311	CY	689 LF of new channel; 2 FT streambed thickness; 55.2 SF XS
Sorting and Stockpiling [3]	319	CY	Includes both Engineered Stream Bed Material and Rock Armoring
Rock Armoring/ Grade Control [3]	9	CY	1 grade control structure
Ephemeral Swale Channel Material [3]	0	CY	
General Fill	0	CY	
Filter Material	0	CY	
Topsoil/ Growth Media [3]	0	CY	
Liner	0	SF	
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	0	LF	Assumes 0% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	0	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	0	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	0	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	0	LF	Assumes 0% of total length of bank treatment
Brushlayer Live Cuttings	0	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	0	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	0	LF	Assumes 0% of total length of bank treatment
Brushlayer Live Cuttings	0	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	0	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	0	EA	None
Riffle Material	0	CY	No. of riffles x 20' length x 10' width; 1ft thickness
Energy Dissipation Pool	1	EA	No. varies by reach
Boulders	29	EA	Based on bankfull width
Dissipation Pool Streambed Material	1	CY	Based on bankfull width, length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	0	EA	None
Foundation Logs	0	EA	0 per structure
Log with Rootwad	0	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	0	CY	2 CY per structure
Racking Material	0	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	0	EA	None
Log with Rootwad	0	EA	1 per structure
Retaining Log	0	EA	1 per structure
Tight Radius Jam Structure	0	EA	None
Foundation Logs	0	EA	3 per structure
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	7 CY per structure
Racking Material	0	EA	7 per structure
Bend Jam Structure	0	EA	None
Foundation Logs	0	EA	2 per structure
Log with Rootwad	0	EA	3 per structure
Whole Tree	0	EA	1 per structure
Small Woody Debris	0	CY	13 CY per structure
Racking Material	0	EA	15 per structure
Sweeper Log Structure	0	EA	None
Whole Tree	0	EA	1 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Channel Spanning Jam	0	EA	None
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Wood Habitat Structure	0	EA	None
Log with Rootwad	0	EA	4 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Turning Log Structure	0	EA	None
Log with Rootwad	0	EA	4 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Boulders	0	EA	2 per structure
Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	10 per Alcove
Oxbow Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	25 per Alcove
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre, intended for anually wet areas
Zone 2	153	EA	4840 plants per acre
Zone 3	121	EA	3825 plants per acre
Zone 4	299	EA	1891 plants per acre
Seeding			
Zone 2	0.03	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.03	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	0.16	AC	5' width each side of channel; 19.02 pure live seed/AC

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MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
West End Creek - West End Pit - WE3
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: ---

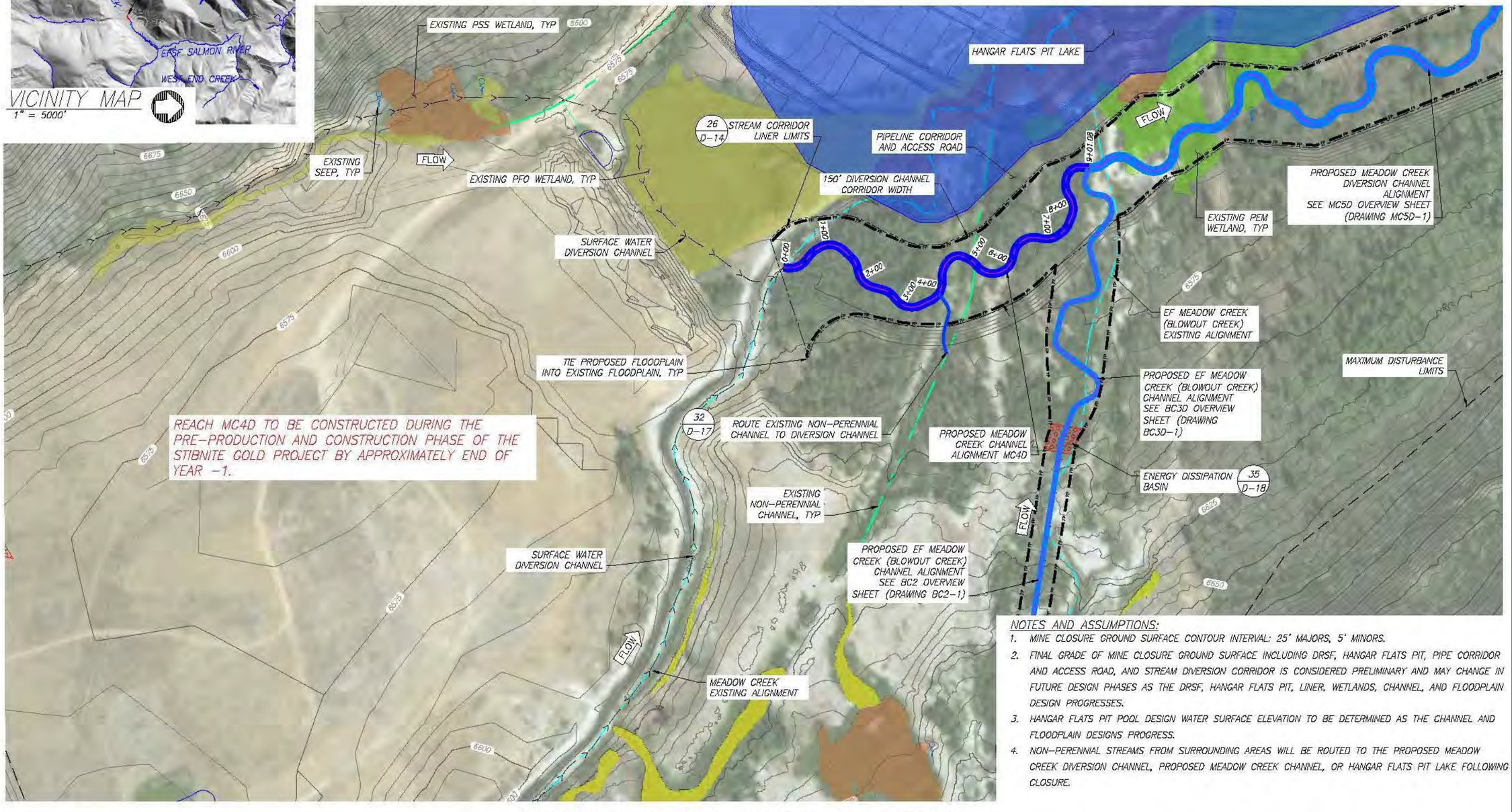
Drawing Name
WE3 Quantities

Drawing No.
WE3-2

VICINITY MAP
1" = 5000'

MC4 DIVERSION PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
MC4-D	656	901	1.4	1.52	1.11

MC4 DIVERSION PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
MC4-D	901	127



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE INCLUDING DRSF, HANGAR FLATS PIT, PIPE CORRIDOR AND ACCESS ROAD, AND STREAM DIVERSION CORRIDOR IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE DRSF, HANGAR FLATS PIT, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. HANGAR FLATS PIT POOL DESIGN WATER SURFACE ELEVATION TO BE DETERMINED AS THE CHANNEL AND FLOODPLAIN DESIGNS PROGRESS.
4. NON-PERENNIAL STREAMS FROM SURROUNDING AREAS WILL BE ROUTED TO THE PROPOSED MEADOW CREEK DIVERSION CHANNEL, PROPOSED MEADOW CREEK CHANNEL, OR HANGAR FLATS PIT LAKE FOLLOWING CLOSURE.

MEADOW CREEK REACH 4 DIVERSION SITE OVERVIEW PLAN

0 200 400 Feet

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MIDAS GOLD

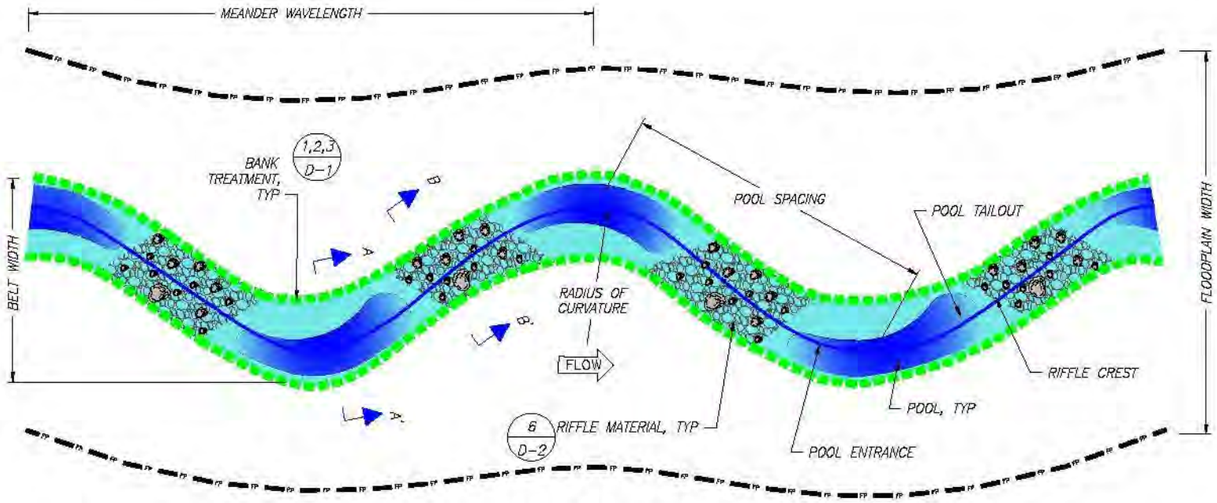
Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Meadow Creek - Hangar Flats Pit - Reach MC4D
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: --

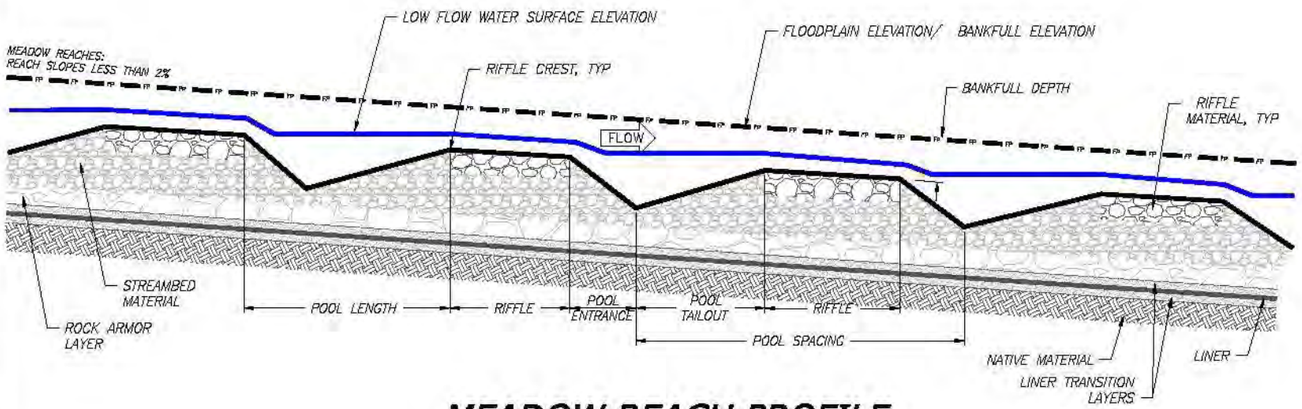
Drawing Name
MC4D Overview Sheet

Drawing No.
MC4D-1



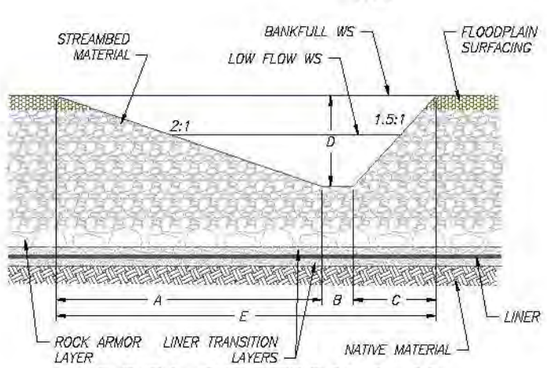
MEADOW REACH PLAN VIEW

NTS



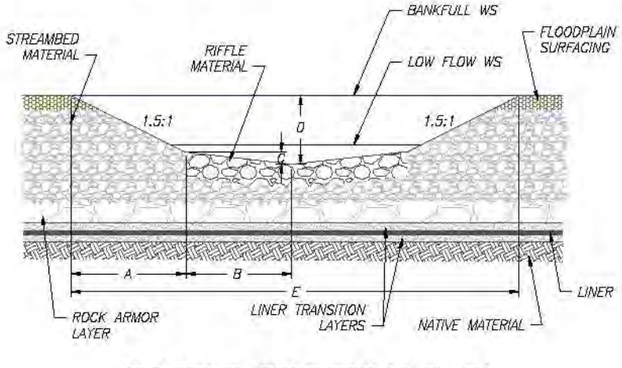
MEADOW REACH PROFILE

NTS



POOL SECTION A-A'

NTS



RIFFLE SECTION B-B'

NTS

NOTES

1. CHANNEL AND FLOODPLAIN SHALL BE CONSTRUCTED TO THE DIMENSIONS IDENTIFIED IN THE CHANNEL DEFINITION TABLES AND AT THE LOCATIONS SHOWN IN INDIVIDUAL REACH OVERVIEW PLAN SHEETS.
2. CHANNEL SIZING FOR TYPICAL POOL AND RIFFLE CROSS SECTIONS IS BASED ON CHANNEL FORMING (BANKFULL) DESIGN FLOW. DETAILED TYPICAL SECTIONS FOR OTHER STREAM HABITATS WILL BE DEVELOPED IN A FUTURE DESIGN PHASE.
3. BANK TREATMENT TYPES ARE NOT DEPICTED IN THE TYPICAL POOL AND RIFFLE SECTIONS. SEE SHEETS D-1 AND D-2 FOR BANK TREATMENT DETAILS.
4. SEE SHEETS D-3 THROUGH D-10 FOR HABITAT STRUCTURE DETAILS.
5. HABITAT STRUCTURE SPACING AND ASSOCIATED QUANTITIES ARE SUMMARIZED IN INDIVIDUAL REACH QUANTITY SHEETS.
6. SEE SHEETS D-1 AND D-20 FOR PLANTING AND SEEDING DETAILS AND PLANTING SCHEDULES.
7. SEE SHEETS D-13 THROUGH D-14 FOR TYPICAL FLOODPLAIN CROSS SECTIONS.

MC4D – MEADOW REACH
PROPOSED CHANNEL DEFINITION TABLES

PLAN TABLE

REACH ID	BANKFULL FLOW (CFS)	BANKFULL WIDTH (FT)	WIDTH/ DEPTH RATIO	AVERAGE DEPTH AT BANKFULL (FT)	MEANDER WAVELENGTH (FT)	MEANDER BELT WIDTH (FT)	RADIUS OF CURVATURE (FT)	AVG POOL SPACING (FT)	FLOODPLAIN WIDTH (FT)
MC4-D	**89**	**16**	**13**	**1.3**	**160 - 205**	**85 - 120**	**25 - 100**	**65 - 205**	**150**

PROFILE TABLE

REACH ID	RIFFLE LENGTH (FT)	POOL LENGTH (FT)	POOL ENTRANCE SLOPE (%)	POOL TAILOUT SLOPE (%)
MC4-D	**25 - 185**	**15 - 40**	**35 - 45**	**17 - 42**

MATERIALS TABLE

REACH ID	STREAMBED MATERIAL TYPE	STREAMBED MATERIAL AVG THICKNESS (FT)	RIFFLE MATERIAL TYPE	RIFFLE MATERIAL AVG THICKNESS (FT)	FLOODPLAIN MATERIAL TYPE	FLOODPLAIN MATERIAL AVG THICKNESS (FT)	FLOODPLAIN SURFACING TYPE	FLOODPLAIN SURFACING AVG THICKNESS (FT)
MC4-D								

NOTES

1. MATERIALS TABLE TO BE DEVELOPED IN FUTURE DESIGN.
2. STREAMBED MATERIAL TYPES: S1 (D50 = XX"), S2 (D50 = XX"), S3 (D50 = XX").
3. RIFFLE MATERIAL TYPES: S1, S2, S3, R1 (D50 = XX"), R2 (D50 = XX").
4. FLOODPLAIN SURFACING MATERIAL TYPES: GROWTH MEDIA, ALGAE, HYDROMULCH, OR NONE.

SECTIONS TABLE

SECTION	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)	F (FT)	G (FT)	H (FT)
POOL SECTION A - A'	**3.4**	**0.0**	**6.8**	**9.0**	**6.8**	**3.4**	**4.6**	**26.1**
RIFFLE SECTION B - B'	**1.8**	**6.0**	**0.6**	**1.8**	**16.3**			

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MIDAS GOLD

Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Meadow Creek - Hangar Flats Pit - Reach MC4D
Valley County, Idaho

Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: --

Drawing Name
MC4D Typical Plan and Profile

Drawing No.
MC4D-2

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Medium complexity for water managment
Stormwater Management			
BMPs and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	Low complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	0	CY	
Floodplain Excavation (Cut)	0	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	0	CY	
Engineered Streambed Material [3]	2,473	CY	901 LF of new channel; 4.05 FT average streambed thickness
Sorting and Stockpiling [3]	4,706	CY	Includes Engineered Streambed Material and Rock Armoring/Grade Control
Rock Armoring/ Grade Control [3]	2,232	CY	6" thick layer over the liner area
Ephemeral Swale Channel Material	9	CY	127 LF of new channel; 0.5 FT gravel thickness; 2' SF XS area
General Fill	13,228	CY	
Filter Material	8,930	CY	
Topsoil/ Growth Media [3]	3,897	CY	12" thickness within Liner Area
Liner	120,550	SF	Includes all material and labor
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	901	LF	Assumes 50% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	1,802	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	1,802	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	601	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	3,604	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	270	LF	Assumes 15% of total length of bank treatment
Brushlayer Live Cuttings	541	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	76	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	270	LF	Assumes 15% of total length of bank treatment
Brushlayer Live Cuttings	541	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	38	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	10	EA	2 per channel meander wave length
Riffle Material	75	CY	No. of riffles x 20' length x 10' width; 1ft thickness
Energy Dissipation Pool	0	EA	None
Boulders	0	EA	Based on bankfull width
Dissipation Pool Streambed Material	0	CY	Based on bankfull width, length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	1	EA	1 every 4 channel meander wave lengths
Foundation Logs	0	EA	0 per structure
Log with Rootwad	4	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	3	CY	2 CY per structure
Racking Material	3	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	9	EA	1 per 100 linear feet of new channel
Log with Rootwad	9	EA	1 per structure
Retaining Log	9	EA	1 per structure
Tight Radius Jam Structure	1	EA	1 every 6 channel meander wave lengths
Foundation Logs	6	EA	3 per structure
Log with Rootwad	5	EA	3 per structure
Small Woody Debris	11	CY	7 CY per structure
Racking Material	12	EA	7 per structure
Bend Jam Structure	1	EA	1 every 6 channel meander wave lengths
Foundation Logs	2	EA	2 per structure
Log with Rootwad	3	EA	3 per structure
Whole Tree	2	EA	1 per structure
Small Woody Debris	11	CY	13 CY per structure
Racking Material	13	EA	15 per structure
Sweeper Log Structure	0	EA	None
Whole Tree	0	EA	1 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Channel Spanning Jam	0	EA	None
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Wood Habitat Structure	3	EA	1 every 2 channel meander wave lengths
Log with Rootwad	10	EA	4 per structure
Small Woody Debris	8	CY	3 CY per structure
Racking Material	8	EA	3 per structure
Turning Log Structure	0	EA	None
Log with Rootwad	0	EA	4 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Boulders	0	EA	2 per structure
Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	10 per Alcove
Oxbow Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	25 per Alcove
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre, intended for anually wet areas
Zone 2	200	EA	4840 plants per acre
Zone 3	158	EA	3825 plants per acre
Zone 4	391	EA	1891 plants per acre
Seeding			
Zone 2	0.04	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.04	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	0.21	AC	5' width each side of channel; 19.02 pure live seed/AC

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MIDAS GOLD

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Valley County, Idaho

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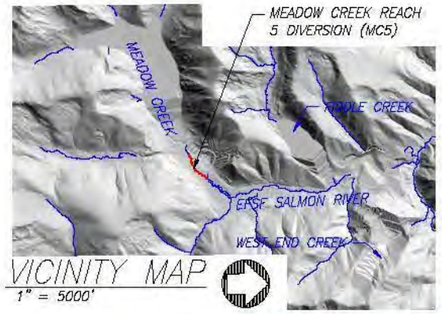
Drawing Name
MC4D Quantities

Drawing No.
MC4D-3

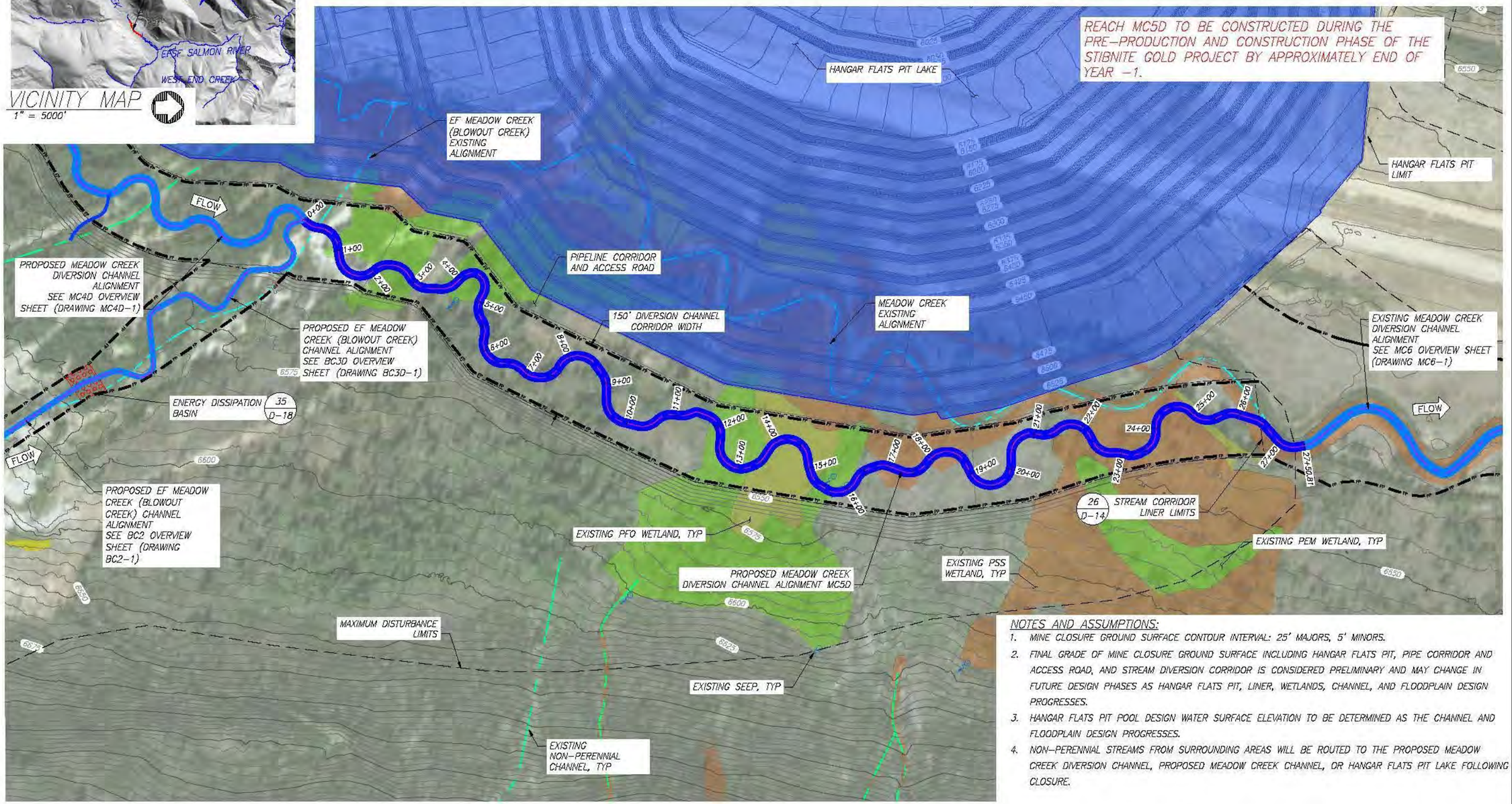


VICINITY MAP
1" = 5000'

MC5 DIVERSION PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
MC5-D	2,125	2,751	1.3	0.56	0.44

MC5 DIVERSION PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
MC5-D	2,751	0

REACH MC5D TO BE CONSTRUCTED DURING THE PRE-PRODUCTION AND CONSTRUCTION PHASE OF THE STIBNITE GOLD PROJECT BY APPROXIMATELY END OF YEAR -1.



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE INCLUDING HANGAR FLATS PIT, PIPE CORRIDOR AND ACCESS ROAD, AND STREAM DIVERSION CORRIDOR IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS HANGAR FLATS PIT, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. HANGAR FLATS PIT POOL DESIGN WATER SURFACE ELEVATION TO BE DETERMINED AS THE CHANNEL AND FLOODPLAIN DESIGN PROGRESSES.
4. NON-PERENNIAL STREAMS FROM SURROUNDING AREAS WILL BE ROUTED TO THE PROPOSED MEADOW CREEK DIVERSION CHANNEL, PROPOSED MEADOW CREEK CHANNEL, OR HANGAR FLATS PIT LAKE FOLLOWING CLOSURE.

MEADOW CREEK REACH 5 DIVERSION SITE OVERVIEW PLAN

0 200 400 Feet

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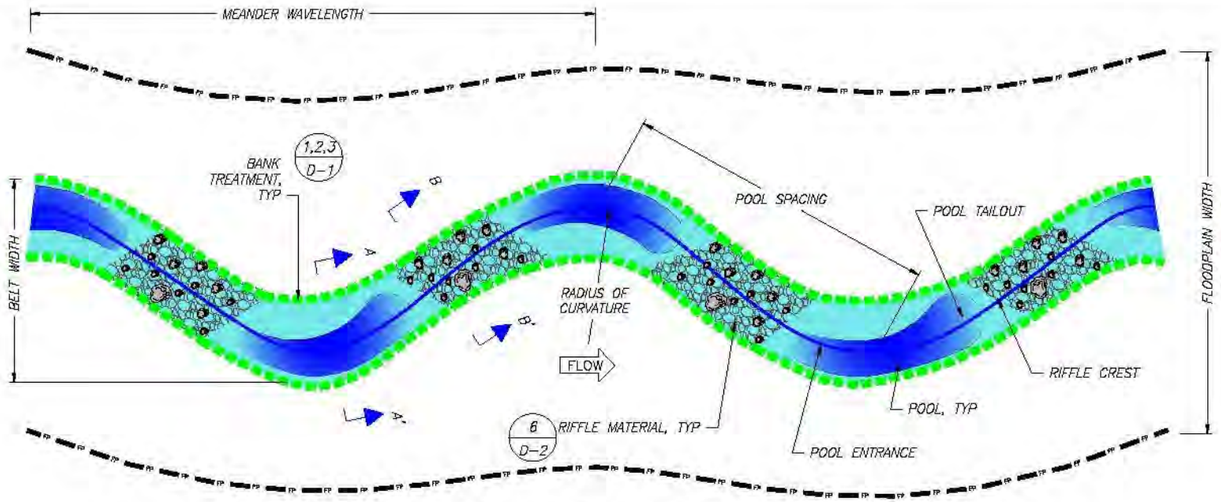
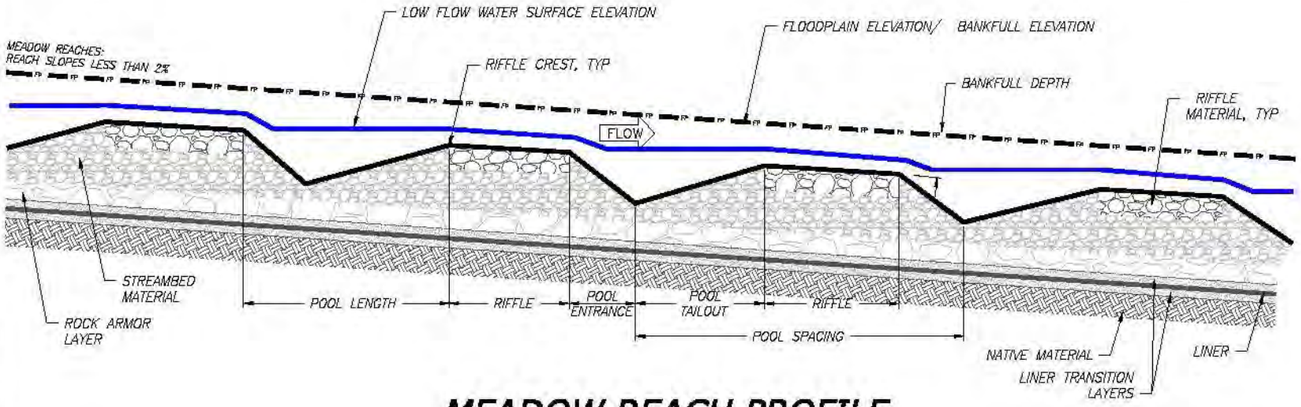
Drawing Name
MC5D Overview Sheet

Drawing No.
MC5D-1



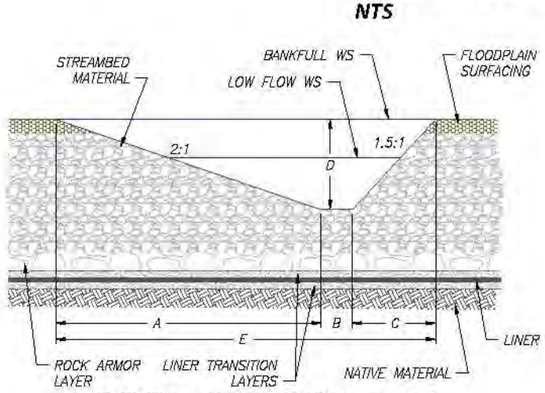
MEADOW REACH PLAN VIEW

NTS



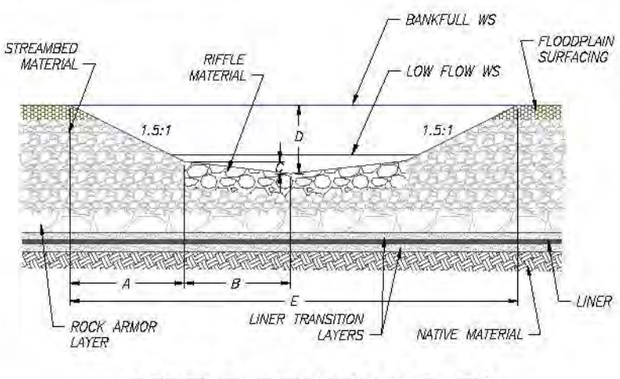
MEADOW REACH PROFILE

NTS



POOL SECTION A-A'

NTS



RIFFLE SECTION B-B'

NTS

NOTES

1. CHANNEL AND FLOODPLAIN SHALL BE CONSTRUCTED TO THE DIMENSIONS IDENTIFIED IN THE CHANNEL DEFINITION TABLES AND AT THE LOCATIONS SHOWN IN INDIVIDUAL REACH OVERVIEW PLAN SHEETS.
2. CHANNEL SIZING FOR TYPICAL POOL AND RIFFLE CROSS SECTIONS IS BASED ON CHANNEL FORMING (BANKFULL) DESIGN FLOW. DETAILED TYPICAL SECTIONS FOR OTHER STREAM HABITATS WILL BE DEVELOPED IN A FUTURE DESIGN PHASE.
3. BANK TREATMENT TYPES ARE NOT DEPICTED IN THE TYPICAL POOL AND RIFFLE SECTIONS. SEE SHEETS D-1 AND D-2 FOR BANK TREATMENT DETAILS.
4. SEE SHEETS D-3 THROUGH D-10 FOR HABITAT STRUCTURE DETAILS.
5. HABITAT STRUCTURE SPACING AND ASSOCIATED QUANTITIES ARE SUMMARIZED IN INDIVIDUAL REACH QUANTITY SHEETS.
6. SEE SHEETS D-1 AND D-20 FOR PLANTING AND SEEDING DETAILS AND PLANTING SCHEDULES.
7. SEE SHEETS D-13 THROUGH D-14 FOR TYPICAL FLOODPLAIN CROSS SECTIONS.

MC5D – MEADOW REACH
PROPOSED CHANNEL DEFINITION TABLES

PLAN TABLE

REACH ID	BANKFULL FLOW (CFS)	BANKFULL WIDTH (FT)	WIDTH/ DEPTH RATIO	AVERAGE DEPTH AT BANKFULL (FT)	MEANDER WAVELENGTH (FT)	MEANDER BELT WIDTH (FT)	RADIUS OF CURVATURE (FT)	AVG POOL SPACING (FT)	FLOODPLAIN WIDTH (FT)
MC5-D	**108**	**17**	**10**	**1.6**	**160-205**	**85-165**	**25-100**	**65-205**	**150**

PROFILE TABLE

REACH ID	RIFFLE LENGTH (FT)	POOL LENGTH (FT)	POOL ENTRANCE SLOPE (%)	POOL TAILOUT SLOPE (%)
MC5-D	**25-190**	**15-40**	**42-45**	**21-51**

MATERIALS TABLE

REACH ID	STREAMBED MATERIAL TYPE	STREAMBED MATERIAL AVG THICKNESS (FT)	RIFFLE MATERIAL TYPE	RIFFLE MATERIAL AVG THICKNESS (FT)	FLOODPLAIN MATERIAL TYPE	FLOODPLAIN MATERIAL AVG THICKNESS (FT)	FLOODPLAIN SURFACING TYPE	FLOODPLAIN SURFACING AVG THICKNESS (FT)
MC5-D								

NOTES

1. MATERIALS TABLE TO BE DEVELOPED IN FUTURE DESIGN.
2. STREAMBED MATERIAL TYPES: S1 (D50 = XX"), S2 (D50 = XX"), S3 (D50 = XX").
3. RIFFLE MATERIAL TYPES: S1, S2, S3, R1 (D50 = XX"), R2 (D50 = XX").
4. FLOODPLAIN SURFACING MATERIAL TYPES: GROWTH MEDIA, ALGAE, HYDROMULCH, OR NONE.

SECTIONS TABLE

SECTION	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)	F (FT)	G (FT)	H (FT)
MC5D POOL SECTION A-A'	**4.2**	**1.9**	**8.4**	**3.7**	**8.4**	**4.2**	**5.6**	**26.6**
MC5D RIFFLE SECTION B-B'	**2.4**	**6.0**	**0.6**	**2.2**	**16.6**			

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Drawing Name
MC5D Typical Plan and Profile

Drawing No.
MC5D-2

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Low complexity for water managment
Stormwater Management			
BMPs and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	Low complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	0	CY	
Floodplain Excavation (Cut)	0	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	0	CY	
Engineered Streambed Material [3]	9,665	CY	2751 LF of new channel; 5.1 FT average streambed thickness
Sorting and Stockpiling [3]	15,577	CY	Includes Engineered Streambed Material and Rock Armoring/Grade Control
Rock Armoring/ Grade Control [3]	5,912	CY	6" thick layer over the liner area
Ephemeral Swale Channel Material	0	CY	
General Fill	43,711	CY	
Filter Material	23,648	CY	
Topsoil/ Growth Media [3]	10,133	CY	12" thickness within Liner Area
Liner	319,250	SF	Includes all material and labor
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	2,751	LF	Assumes 50% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	5,502	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	5,502	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	1,834	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	11,004	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	825	LF	Assumes 15% of total length of bank treatment
Brushlayer Live Cuttings	1,651	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	231	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	825	LF	Assumes 15% of total length of bank treatment
Brushlayer Live Cuttings	1,651	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	116	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	29	EA	2 per channel meander wave length
Riffle Material	217	CY	No. of riffles x 20' length x 10' width; 1ft thickness
Energy Dissipation Pool	0	EA	None
Boulders	0	EA	Based on bankfull width
Dissipation Pool Streambed Material	0	CY	Based on bankfull width, length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	4	EA	1 every 4 channel meander wave lengths
Foundation Logs	0	EA	0 per structure
Log with Rootwad	11	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	7	CY	2 CY per structure
Racking Material	7	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	28	EA	1 per 100 linear feet of new channel
Log with Rootwad	28	EA	1 per structure
Retaining Log	28	EA	1 per structure
Tight Radius Jam Structure	2	EA	1 every 6 channel meander wave lengths
Foundation Logs	17	EA	3 per structure
Log with Rootwad	15	EA	3 per structure
Small Woody Debris	32	CY	7 CY per structure
Racking Material	34	EA	7 per structure
Bend Jam Structure	2	EA	1 every 6 channel meander wave lengths
Foundation Logs	5	EA	2 per structure
Log with Rootwad	7	EA	3 per structure
Whole Tree	5	EA	1 per structure
Small Woody Debris	32	CY	13 CY per structure
Racking Material	37	EA	15 per structure
Sweeper Log Structure	0	EA	None
Whole Tree	0	EA	1 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Channel Spanning Jam	0	EA	None
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Wood Habitat Structure	7	EA	1 every 2 channel meander wave lengths
Log with Rootwad	29	EA	4 per structure
Small Woody Debris	22	CY	3 CY per structure
Racking Material	22	EA	3 per structure
Turning Log Structure	0	EA	None
Log with Rootwad	0	EA	4 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Boulders	0	EA	2 per structure
Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	10 per Alcove
Oxbow Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	25 per Alcove
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre, intended for anually wet areas
Zone 2	611	EA	4840 plants per acre
Zone 3	483	EA	3825 plants per acre
Zone 4	1,194	EA	1891 plants per acre
Seeding			
Zone 2	0.13	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.13	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	0.63	AC	5' width each side of channel; 19.02 pure live seed/AC

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MIDAS GOLD

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Stream and Wetland Restoration Concept Design
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Valley County, Idaho

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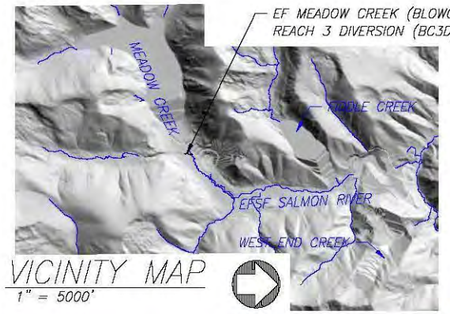
Drawing Name
MC5D Quantities

Drawing No.
MC5D-3

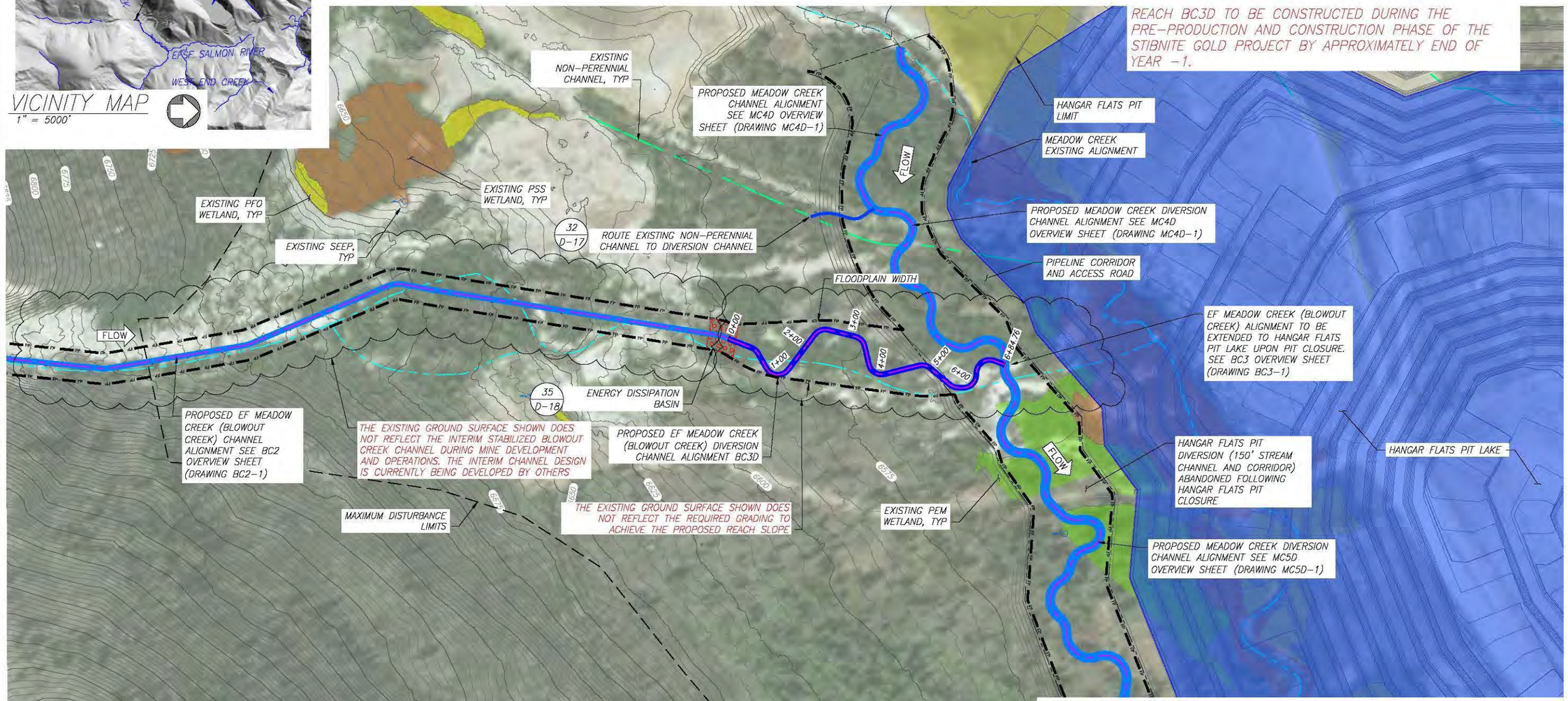


VICINITY MAP
1" = 5000'

BC3 DIVERSION PROPOSED CHANNEL CHARACTERISTICS					
REACH ID	VALLEY LENGTH (FT)	CHANNEL LENGTH (FT)	SINUOSITY	VALLEY SLOPE (%)	REACH SLOPE (%)
BC3-D	527	685	1.3	6.33	4.87

BC3 DIVERSION PROPOSED STREAM TREATMENTS		
REACH ID	PERENNIAL CHANNEL LENGTH (FT)	NON-PERENNIAL CHANNEL LENGTH (FT)
BC3-D	685	0

REACH BC3D TO BE CONSTRUCTED DURING THE PRE-PRODUCTION AND CONSTRUCTION PHASE OF THE STIBNITE GOLD PROJECT BY APPROXIMATELY END OF YEAR -1.



NOTES AND ASSUMPTIONS:

1. MINE CLOSURE GROUND SURFACE CONTOUR INTERVAL: 25' MAJORS, 5' MINORS.
2. FINAL GRADE OF MINE CLOSURE GROUND SURFACE ON TSF IS CONSIDERED PRELIMINARY AND MAY CHANGE IN FUTURE DESIGN PHASES AS THE TSF, LINER, WETLANDS, CHANNEL, AND FLOODPLAIN DESIGN PROGRESSES.
3. NON-PERENNIAL STREAMS FROM SURROUNDING AREAS WILL BE ROUTED TO THE PROPOSED MEADOW CREEK CHANNEL.

EF MEADOW CREEK (BLOWOUT CREEK) REACH 3 DIVERSION SITE OVERVIEW PLAN

0 200 400 Feet

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Stibnite Gold Project
Stream and Wetland Restoration Conceptual Design
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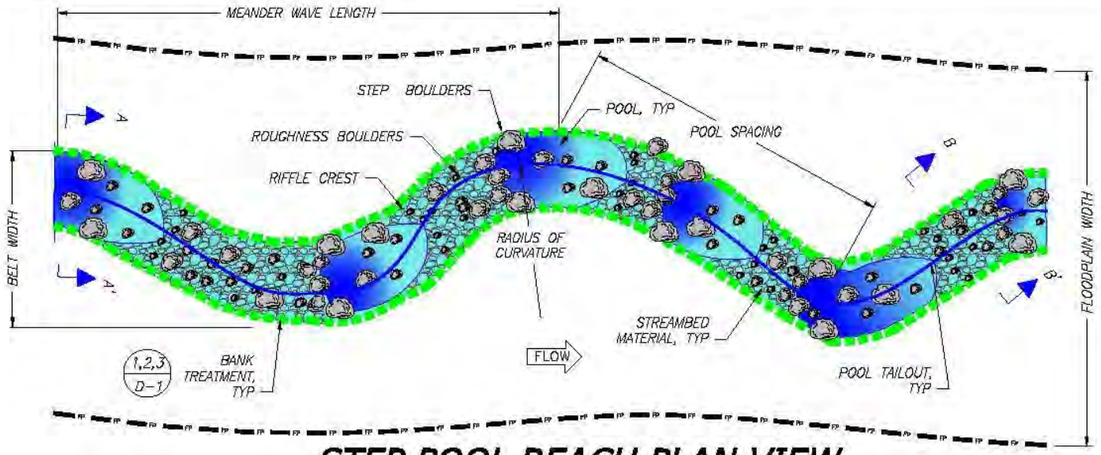
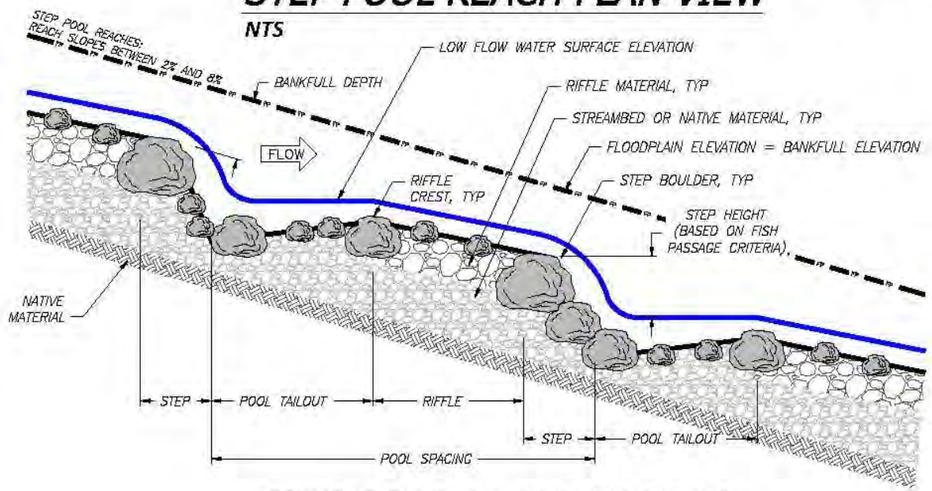
Drawing Name
BC3D Overview Sheet

Drawing No.
BC3D-1



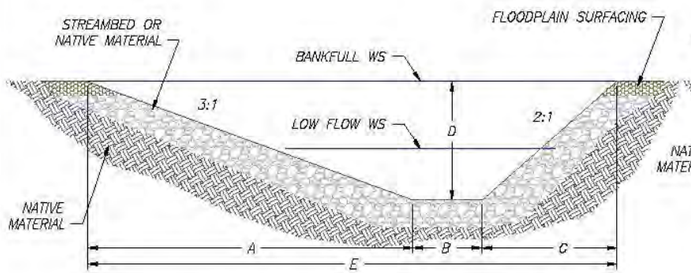
STEP POOL REACH PLAN VIEW

NTS



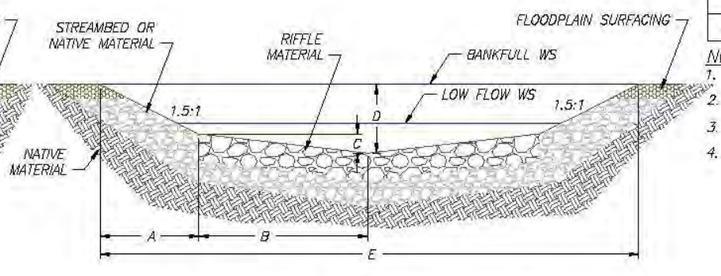
STEP POOL REACH PROFILE

NTS



POOL SECTION A-A'

NTS



RIFFLE SECTION B-B'

NTS

NOTES

1. CHANNEL AND FLOODPLAIN SHALL BE CONSTRUCTED TO THE DIMENSIONS IDENTIFIED IN THE CHANNEL DEFINITION TABLES AND AT THE LOCATIONS SHOWN IN INDIVIDUAL REACH OVERVIEW PLAN SHEETS.
2. CHANNEL SIZING FOR TYPICAL POOL AND RIFFLE CROSS SECTIONS IS BASED ON CHANNEL FORMING (BANKFULL) DESIGN FLOW. DETAILED TYPICAL SECTIONS FOR OTHER STREAM HABITATS WILL BE DEVELOPED IN A FUTURE DESIGN PHASE.
3. BANK TREATMENT TYPES ARE NOT DEPICTED IN THE TYPICAL POOL AND RIFFLE SECTIONS. SEE SHEETS D-1 AND D-2 FOR BANK TREATMENT DETAILS.
4. SEE SHEETS D-3 THROUGH D-10 FOR HABITAT STRUCTURE DETAILS.
5. HABITAT STRUCTURE SPACING AND ASSOCIATED QUANTITIES ARE SUMMARIZED IN INDIVIDUAL REACH QUANTITY SHEETS.
6. SEE SHEETS D-1 AND D-20 FOR PLANTING AND SEEDING DETAILS AND PLANTING SCHEDULES.
7. SEE SHEETS D-13 THROUGH D-14 FOR TYPICAL FLOODPLAIN CROSS SECTIONS.

PLAN TABLE

REACH ID	BANKFULL FLOW (CFS)	BANKFULL WIDTH (FT)	WIDTH/ DEPTH RATIO	AVERAGE DEPTH AT BANKFULL (FT)	MEANDER WAVELENGTH (FT)	MEANDER BELT WIDTH (FT)	RADIUS OF CURVATURE (FT)	AVG POOL SPACING (FT)	FLOODPLAIN WIDTH (FT)
BC3-D	**38**	**12**	**13**	**1.0**	**120 - 150**	**60 - 80**	**20 - 75**	**50 - 150**	**80 - 160**

PROFILE TABLE

REACH ID	RIFFLE LENGTH (FT)	POOL LENGTH (FT)	POOL ENTRANCE SLOPE (%)	POOL TAILOUT SLOPE (%)
BC3-D	**20 - 140**	**10 - 30**	**26 - 45**	**13 - 31**

MATERIALS TABLE

REACH ID	STREAMBED MATERIAL TYPE	STREAMBED MATERIAL AVG THICKNESS (FT)	RIFFLE MATERIAL TYPE	RIFFLE MATERIAL AVG THICKNESS (FT)	FLOODPLAIN MATERIAL TYPE	FLOODPLAIN MATERIAL AVG THICKNESS (FT)	FLOODPLAIN SURFACING TYPE	FLOODPLAIN SURFACING AVG THICKNESS (FT)
BC3-D								

NOTES

1. MATERIALS TABLE TO BE DEVELOPED IN FUTURE DESIGN.
2. STREAMBED MATERIAL TYPES: S1 (D50 = XX"), S2 (D50 = XX"), S3 (D50 = XX").
3. RIFFLE MATERIAL TYPES: S1, S2, S3, R1 (D50 = XX"), R2 (D50 = XX").
4. FLOODPLAIN SURFACING MATERIAL TYPES: GROWTH MEDIA, ALGAE, HYDROMULCH, OR NONE.

SECTIONS TABLE

SECTION	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)
POOL SECTION A - A'	**7.5**	**0.9**	**5.0**	**2.5**	**13.4**
RIFFLE SECTION B - B'	**1.4**	**4.7**	**0.5**	**1.4**	**12.2**

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Valley County, Idaho

Draft

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Approved: --

Drawing Name
BC3D Typical Plan and Profile

Drawing No.
BC3D-2

DETAILED QUANTITIES

Item Description	Quantity	Units	Quantities Assumptions
General			
Mobilization and Demobilization			
Mobilization and Demobilization	1	LS	Approximately 10% of cost pre-tax
Cofferdams and Dewatering			
Cofferdams, Dewatering, Stream Bypass	1	LS	Low complexity for water management
Stormwater Management			
BMPs and SWPPP	1	LS	
Site Access			
Stabilized Temporary Access Road	1	LS	Low complexity of access
Site Work - Earthwork			
Excavation (Cut)			
Channel Excavation (Cut)	827	CY	Channel Length * Top Width * (Depth + D100)
Floodplain Excavation (Cut)	1,015	CY	
Placement (Fill)			
Channel Placement (Fill)	0	CY	
Floodplain Placement (Fill)	0	CY	
Engineered Streambed Material [3]	401	CY	685 LF of new channel; 1.3 FT average streambed thickness
Sorting and Stockpiling [3]	0	CY	
Rock Armoring/ Grade Control [3]	0	CY	
Ephemeral Swale Channel Material	0	CY	
General Fill	0	CY	
Filter Material	0	CY	
Topsoil/ Growth Media [3]	254	CY	12" thickness in Zone 3
Liner	0	SF	
Site Work - Bank Treatments & Structures			
Bank Treatments			
Bank Treatment A - FESL	274	LF	Assumes 20% of total length of bank treatment
GeoCoir 700 (Coarse Coir ECB)	548	LF	2 soil lifts; 15-foot roll width
C125BN (Fine Coir ECB)	548	LF	2 soil lifts; 15-foot roll width
1"x2"x18" Stake	183	EA	Dead Stakes 1 per 3 linear feet of bank treatment
Live Stake	0	EA	None
Brushlayer Live Cuttings	1,096	EA	4 willow cuttings per linear foot of treatment
Bank Treatment B - 12" Brushlayer	0	LF	Assumes 0% of total length of bank treatment
Brushlayer Live Cuttings	0	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	0	CY	0.28 CY per foot
Bank Treatment C - 6" Brushlayer	548	LF	Assumes 40% of total length of bank treatment
Brushlayer Live Cuttings	1,096	EA	2 willow cuttings per linear foot of treatment
Slash for Brushlayer	77	CY	0.14 CY per foot
Miscellaneous Structures			
Constructed Riffles	23	EA	1 per step pool
Riffle Material	251	CY	No. of riffles x 6.5' length x 13' width; D100 thickness
Energy Dissipation Pool	0	EA	None
Boulders	0	EA	Based on bankfull width
Dissipation Pool Streambed Material	0	CY	Based on bankfull width, length 2x width
Small Apex Jam	0	EA	None
Foundation Logs	0	EA	1 per structure
Log with Rootwad	0	EA	3 per structure
Log Piles	0	EA	2 per structure
Small Woody Debris/ Slash	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Toe Log Structure	3	EA	1 every 2 channel meander wave lengths
Foundation Logs	0	EA	0 per structure
Log with Rootwad	8	EA	3 per structure
Boulders	0	CY	0 CY per structure
Small Woody Debris/ Slash	5	CY	2 CY per structure
Racking Material	5	EA	2 per structure

Item Description	Quantity	Units	Quantities Assumptions
Miscellaneous Structures (Continued)			
Log Floodplain Roughness Structure	15	EA	1 per 45 linear feet of new channel
Log with Rootwad	15	EA	1 per structure
Retaining Log	15	EA	1 per structure
Tight Radius Jam Structure	1	EA	1 every 8 channel meander wave lengths
Foundation Logs	4	EA	3 per structure
Log with Rootwad	4	EA	3 per structure
Small Woody Debris	8	CY	7 CY per structure
Racking Material	9	EA	7 per structure
Bend Jam Structure	1	EA	1 every 6 channel meander wave lengths
Foundation Logs	2	EA	2 per structure
Log with Rootwad	3	EA	3 per structure
Whole Tree	2	EA	1 per structure
Small Woody Debris	11	CY	13 CY per structure
Racking Material	13	EA	15 per structure
Sweeper Log Structure	3	EA	1 every 2 channel meander wave lengths
Whole Tree	3	EA	1 per structure
Small Woody Debris	8	CY	3 CY per structure
Racking Material	8	EA	3 per structure
Channel Spanning Jam	0	EA	None
Log with Rootwad	0	EA	3 per structure
Small Woody Debris	0	CY	3 CY per structure
Racking Material	0	EA	3 per structure
Wood Habitat Structure	2	EA	1 every 3 channel meander wave lengths
Log with Rootwad	7	EA	4 per structure
Small Woody Debris	5	CY	3 CY per structure
Racking Material	5	EA	3 per structure
Turning Log Structure	1	EA	1 every 6 channel meander wave lengths
Log with Rootwad	3	EA	4 per structure
Small Woody Debris	3	CY	3 CY per structure
Racking Material	3	EA	3 per structure
Boulders	2	EA	2 per structure
Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	10 per Alcove
Oxbow Backwater Alcove	0	EA	None
Log with Rootwad	0	EA	25 per Alcove
Revegetation (Excludes Revegetation Associated with Bank Treatments)			
Planting & Seeding			
Planting			
Zone 1	0	EA	10890 plants per acre, Intended for anually wet areas
Zone 2	152	EA	4840 plants per acre
Zone 3	120	EA	3825 plants per acre
Zone 4	297	EA	1891 plants per acre
Seeding			
Zone 2	0.03	AC	1' width each side of channel; 3.12 pure live seed/AC
Zone 3	0.03	AC	1' width each side of channel; 3.56 pure live seed/AC
Zone 4	0.16	AC	5' width each side of channel; 19.02 pure live seed/AC

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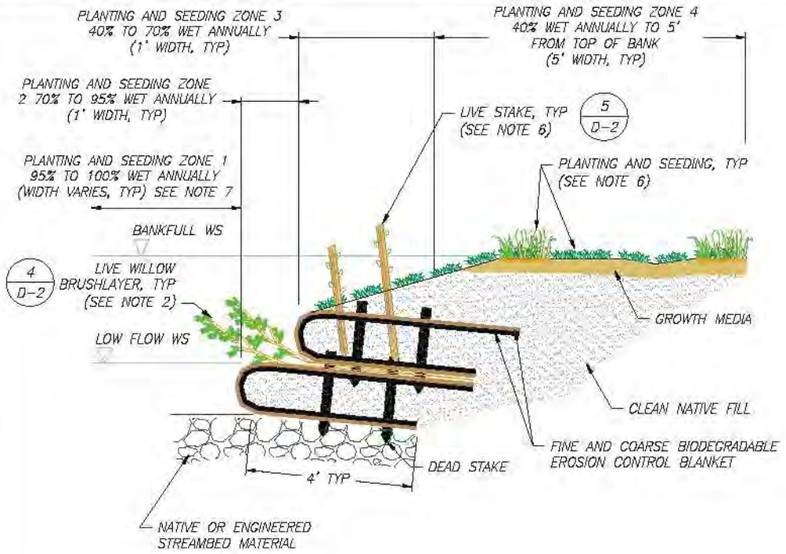
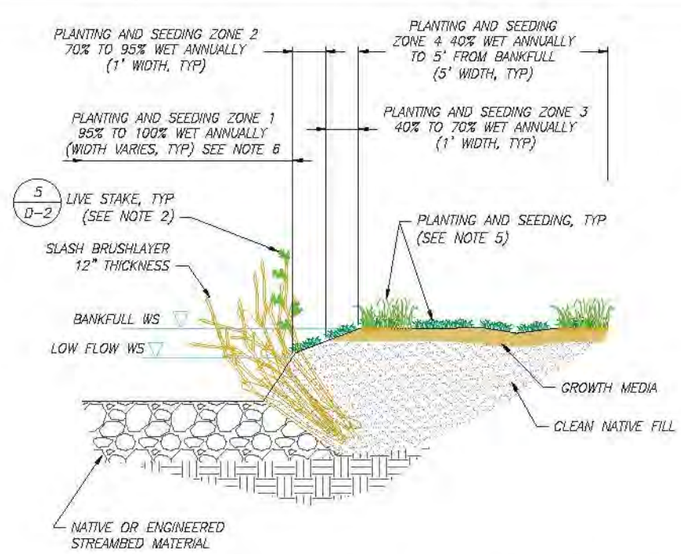
Drawing Name
BC3D Quantities

Drawing No.
BC3D-3



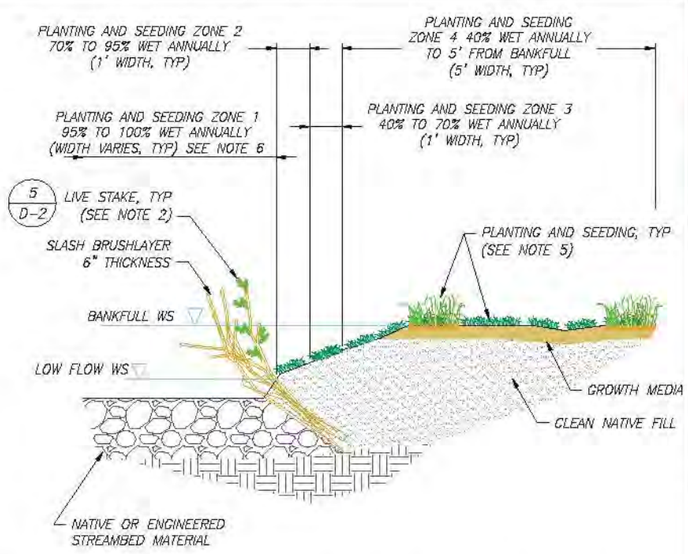
1 BANK TREATMENT A – FABRIC ENCAPSULATED SOIL LIFT (FESL) (SHOWN WITH LIVE BRUSHLAYER AND LIVE STAKES)

NTS



2 BANK TREATMENT B – 12 INCH SLASH BRUSHLAYER WITH LIVE STAKES

NTS



3 BANK TREATMENT C – 6 INCH SLASH BRUSHLAYER WITH LIVE STAKES

NTS

EXAMPLE: FESL INSTALLATION IN FALL DURING DORMANT SEASON

BANK TREATMENT A NOTES:

1. INSTALL BANK TREATMENT A AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED QUANTITY.
2. SEE BANK TREATMENT SCHEDULE ON SHEET D–19 FOR LOCATION AND DENSITY OF LIVE STAKES AND BRUSHLAYER. INSTALL LIVE STAKES AND LIVE BRUSHLAYER ACCORDING TO THE DETAILS WITHIN THE PLANS.
3. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR SPECIFIED QUANTITY OF BANK TREATMENT A AND ASSOCIATED MATERIAL QUANTITIES.
4. EXCAVATE SLOPE ACCORDING TO PLANS. PLACE FINE AND COARSE COIR EROSION CONTROL BLANKET AND BACKFILL WITH NATIVE SOIL TO FINISHED GRADES. USE A TEMPORARY FORM OR BUTTRESS (SEE EXAMPLE PHOTO) AT THE FACE OF EACH FESL LIFT TO ACHIEVE THE DIMENSIONS SHOWN. CONTRACTOR SHALL COMPACT BACKFILL TO APPROXIMATELY 80% OF MAXIMUM DENSITY. PULL EACH LAYER OF EROSION CONTROL BLANKET TIGHT AND ANCHOR WITH DEAD AND LIVE STAKES.
5. CONSTRUCT EACH FESL WITH 1' MAXIMUM THICKNESS USING AS MANY LIFTS AS NECESSARY TO ACHIEVE THE SPECIFIED BANK HEIGHT.
6. REVEGETATE BANK SLOPE AND TOP OF BANK AS SPECIFIED – SEE PLANTING AND SEEDING SCHEDULES ON SHEET D–20 FOR PLANT SPECIES, PLANT DENSITY, SEED MIX, AND APPLICATION RATES.
7. ZONE 1 PLANTING INTENDED FOR ANNUALLY WET AREAS LOCATED AWAY FROM THE MAIN CHANNEL OR IN ALCOVES.

EXAMPLE: SLASH BRUSHLAYER

BANK TREATMENT B AND C NOTES:

1. INSTALL BANK TREATMENT B AND C AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED QUANTITY.
2. SEE BANK TREATMENT SCHEDULE ON SHEETS D–19 FOR LOCATIONS AND DENSITY OF LIVE STAKES.
3. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR SPECIFIED QUANTITY OF BANK TREATMENT A AND ASSOCIATED MATERIAL QUANTITIES.
4. EXCAVATE BANK SLOPE, LAY LIVE STAKES AT SPECIFIED SPACING WITHIN TRENCH, COVER EACH LIVE STAKE WITH 2" OF CLEAN NATIVE FILL, AND LIGHTLY COMPACT. INSTALL SLASH MATERIAL TO THE SPECIFIED THICKNESS AND LAY UPPER LAYER OF LIVE STAKES AT THE SPECIFIED SPACING. FILL VOIDS OF SLASH MATERIAL BY WASHING–IN CLEAN NATIVE FILL. COMPLETE FINISH GRADING OF BANK BEHIND SLASH BRUSHLAYER.
5. REVEGETATE BANK SLOPE AND TOP OF BANK AS SPECIFIED – SEE PLANTING AND SEEDING SCHEDULES ON SHEET D–20 FOR PLANT SPECIES, PLANT DENSITY, SEED MIX, AND APPLICATION RATES.
6. ZONE 1 PLANTING INTENDED FOR ANNUALLY WET AREAS LOCATED AWAY FROM THE MAIN CHANNEL OR IN ALCOVES.

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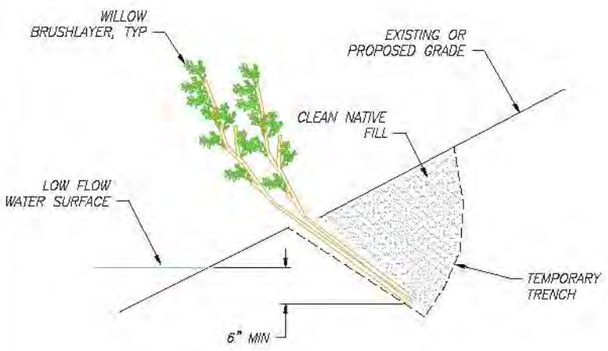
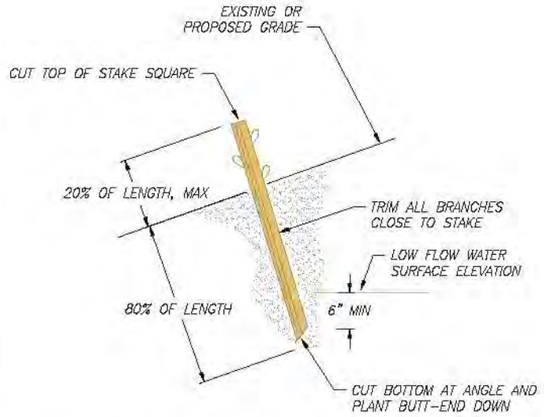
Drawing Name
Typical Details – 1

Drawing No.
D–1



4 LIVE WILLOW TRENCH DETAIL
NTS



5 LIVE STAKE DETAIL
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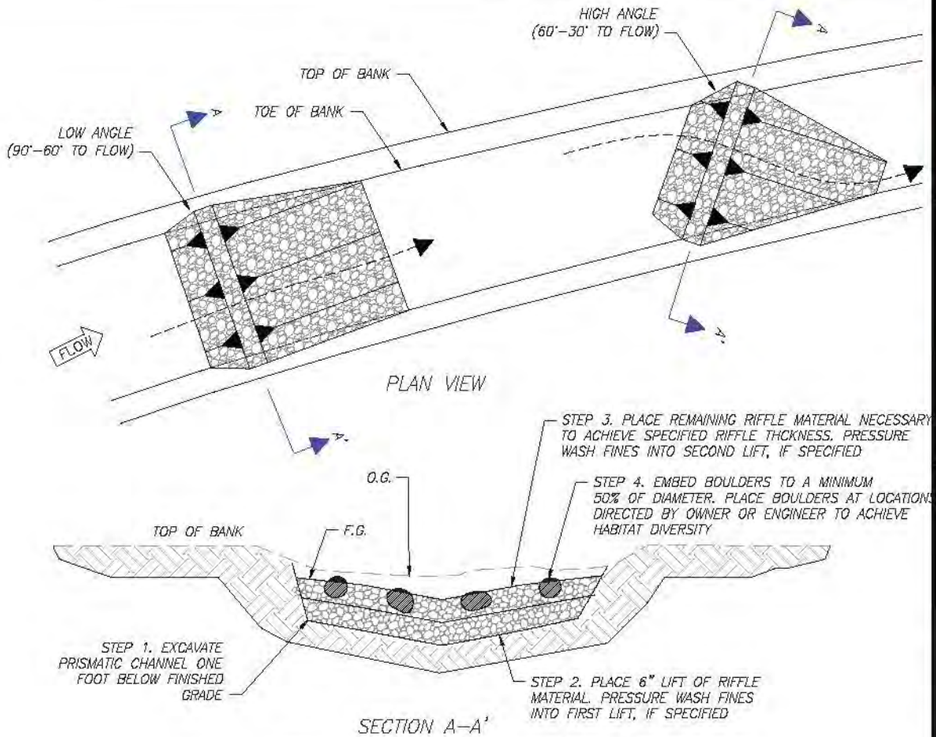

6 CONSTRUCTED RIFFLE
NTS

EXAMPLE: INSTALLED LIVE WILLOW TRENCH

EXAMPLE: INSTALLED LIVE WILLOW STAKE

EXAMPLE: CONSTRUCTED RIFFLE

LIVE WILLOW TRENCH NOTES:
1. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR QUANTITY OF WILLOW STAKES.
2. EXCAVATE TRENCH TO BELOW LOW WATER TABLE OR INSTALL WITHIN BANK OR STRUCTURE PRIOR TO BACKFILLING/ PLACING BANK MATERIALS
3. LAY LIVE CUTTINGS IN TRENCH AT SPECIFIED DENSITY OR QUANTITY
4. PLACE 6" LAYER OF CLEAN NATIVE FILL OVER LIVE CUTTINGS AND COMPACT WITH EXCAVATOR BUCKET
5. COMPLETE BACKFILL AND WATER THOROUGHLY WITHIN 4 HOURS OF INSTALLATION.

LIVE STAKE NOTES:
1. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF LIVE STAKES.
2. USE HEALTHY AND DORMANT SPECIES.
3. MAKE CLEAN CUTS AND DO NOT DAMAGE STAKES OR SPLIT ENDS DURING CONSTRUCTION.
4. INSTALL USING PILOT BAR IN FIRM SOILS. ENSURE BUTT-END OF STAKE IS BELOW (6" MIN) LOW WATER TABLE ELEVATION.
5. TAMP SOIL AROUND INSTALLED STAKE AND WATER THOROUGHLY WITHIN 4 HOURS OF INSTALLATION.

CONSTRUCTED RIFFLE NOTES:
1. INSTALL CONSTRUCTED RIFFLES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.

STRUCTURE INTENT:
1. RIFFLE FEATURES ARE INTENDED TO MIMIC A NATURAL STREAM CHANNEL. RIFFLES ARE TO BE CONSTRUCTED TO BE STABLE AND TO PROVIDE HYDRAULIC ROUGHNESS, FLOODPLAIN ACTIVATION AND FISH RESTING AREAS THROUGH BACKWATER POOL DEVELOPMENT. RIFFLES ARE TO BE CONSTRUCTED SUCH THAT LOW FLOWS REMAIN ON THE SURFACE.
2. HIGH ANGLE CONSTRUCTED RIFFLE PROMOTE THALWEG DEVELOPMENT AND CHANNEL SINUOSITY.

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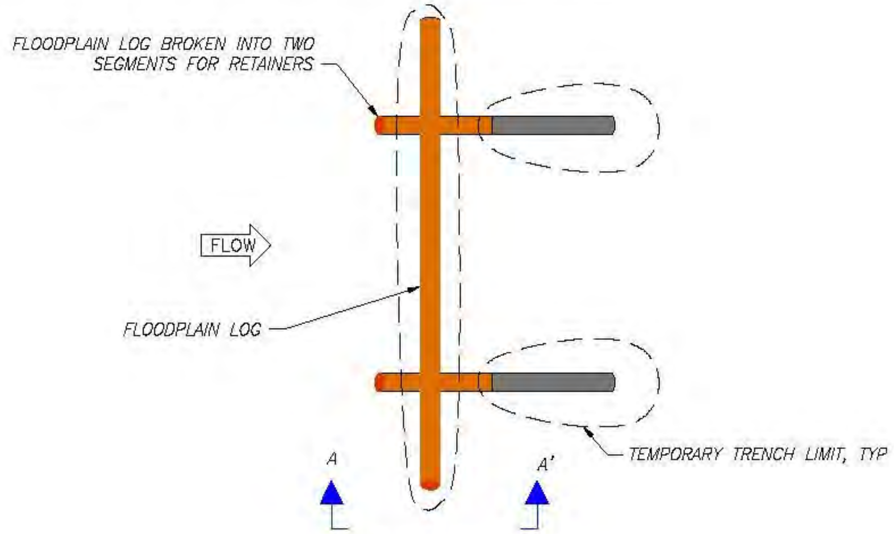
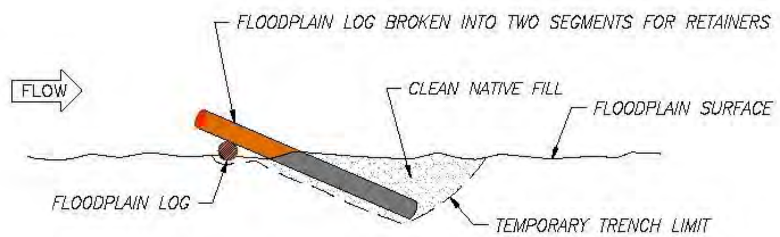
Drawing No.
D-2



PLAN VIEW



SECTION A–A'

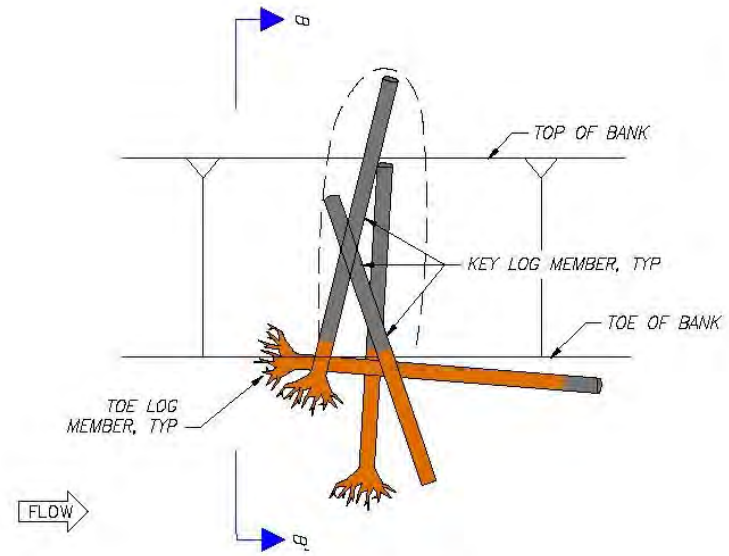
7 LOG FLOODPLAIN ROUGHNESS STRUCTURE

NTS

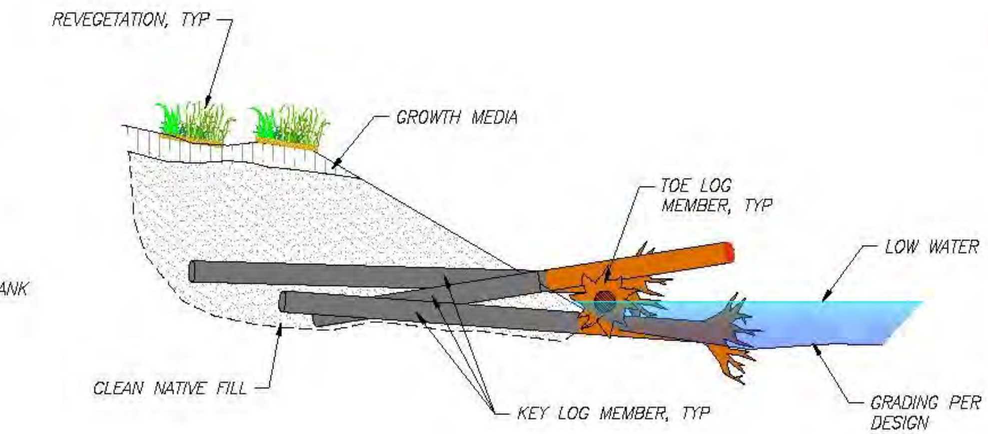
EXAMPLE: INSTALLED LOG FLOODPLAIN ROUGHNESS STRUCTURE

LOG FLOODPLAIN ROUGHNESS STRUCTURE NOTES:

1. INSTALL LOG FLOODPLAIN ROUGHNESS STRUCTURES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
3. BACKFILL USING NATIVE EXCAVATED MATERIAL UNLESS NATIVE MATERIAL IS UNSUITABLE FOR BACKFILL. PLACE BACKFILL IN 1–FOOT MAXIMUM LIFTS. COMPACT EACH LIFT USING MECHANICAL EQUIPMENT SUCH AS AN EXCAVATOR BUCKET OR EQUIPMENT TRACKING.



PLAN VIEW



SECTION B–B'

8 TYPICAL TOE LOG STRUCTURE

NTS

EXAMPLE: INSTALLED TOE LOG STRUCTURE

EXAMPLE: INSTALLED TOE LOG STRUCTURE (FOREGROUND)

TOE LOG STRUCTURE NOTES:

1. INSTALL TOE LOG STRUCTURES AT LOCATIONS INDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
3. BACKFILL USING NATIVE EXCAVATED MATERIAL UNLESS NATIVE MATERIAL IS UNSUITABLE FOR BACKFILL. PLACE BACKFILL IN 1–FOOT MAXIMUM LIFTS. COMPACT EACH LIFT USING MECHANICAL EQUIPMENT SUCH AS AN EXCAVATOR BUCKET OR EQUIPMENT TRACKING.
4. STREAMS LESS THAN 10 FEET WIDE MAY HAVE LOGS PLACED ON THE SURFACE OR BURIED INTO THE BANK.

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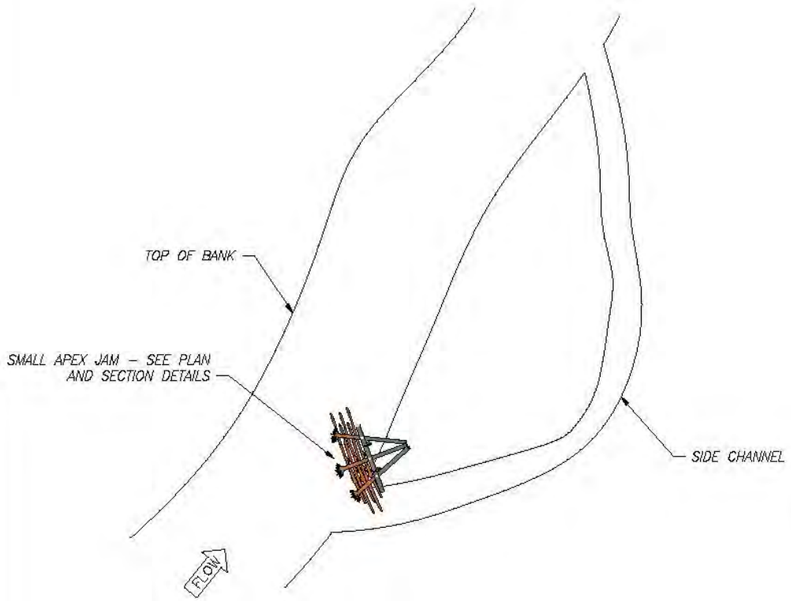
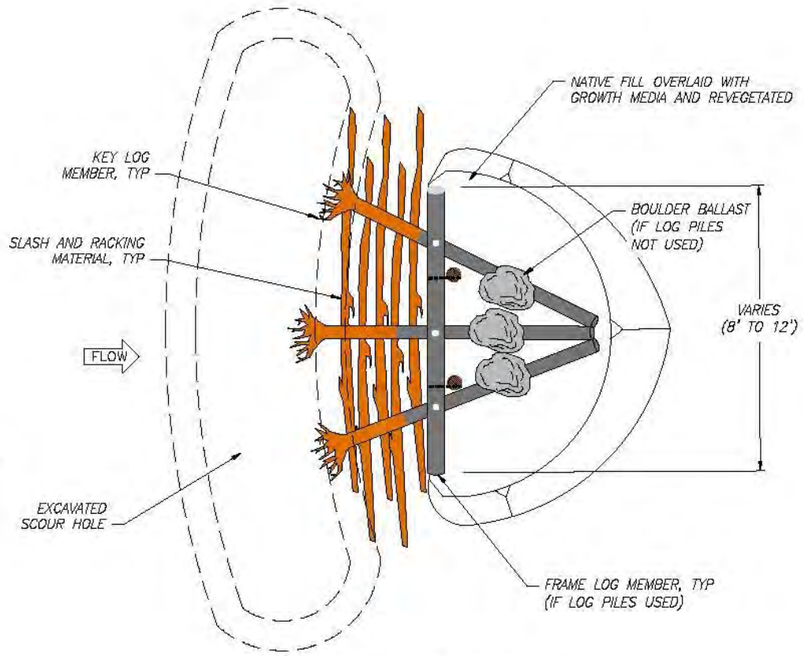
D–3



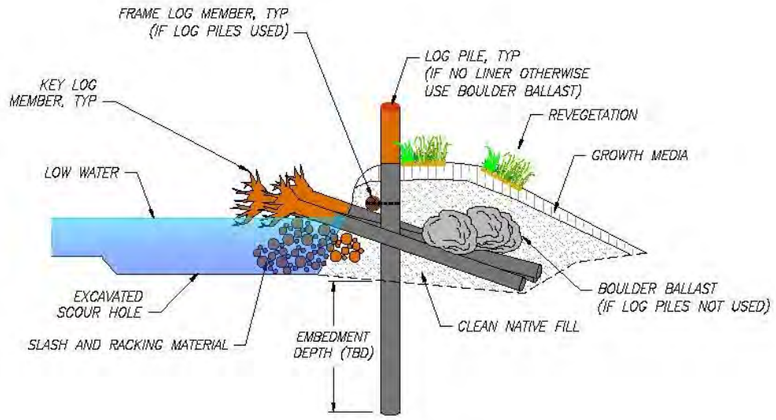
PLAN SCHEMATIC



PLAN VIEW

SMALL APEX JAM STRUCTURE NOTES:

1. INSTALL SMALL APEX JAM STRUCTURES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
3. SMALL APEX JAM STRUCTURES ARE SCALEABLE TO THE SIZE OF STREAM AND MAY CONSIST OF FEWER OR MORE LOGS INCLUDING FEWER KEY LOGS.
4. BACKFILL USING NATIVE EXCAVATED MATERIAL UNLESS NATIVE MATERIAL IS UNSUITABLE FOR BACKFILL. PLACE BACKFILL IN 1–FOOT MAXIMUM LIFTS. COMPACT EACH LIFT USING MECHANICAL EQUIPMENT SUCH AS AN EXCAVATOR BUCKET OR EQUIPMENT TRACKING.
5. LOG PILES MAY BE USED IF NO CHANNEL LINER PRESENT, OTHERWISE USE BOULDER BALLAST.
6. STREAMS LESS THAN 10 FEET WIDE DO NOT REQUIRE PILES.



SECTION VIEW

9 TYPICAL SMALL APEX JAM STRUCTURE

NTS

EXAMPLE: INSTALLED APEX LOG STRUCTURE

EXAMPLE: INSTALLED SINGLE LOG APEX STRUCTURE

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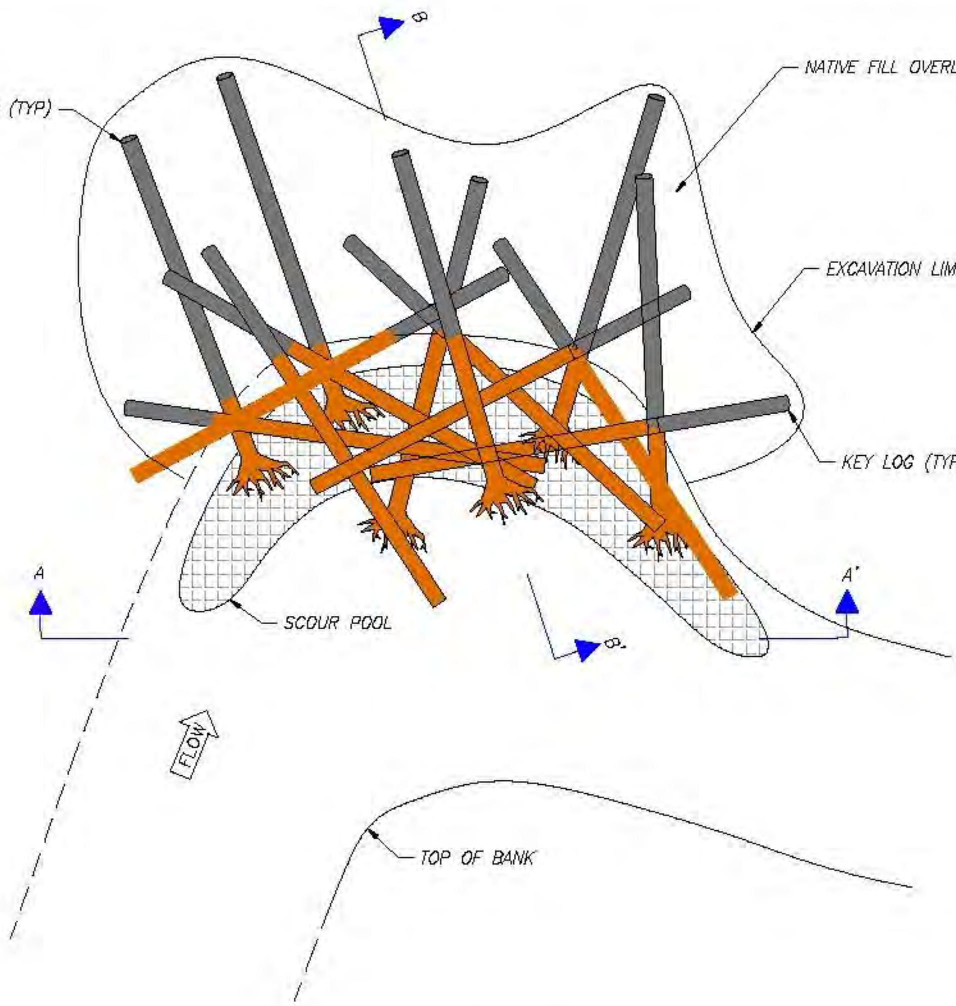
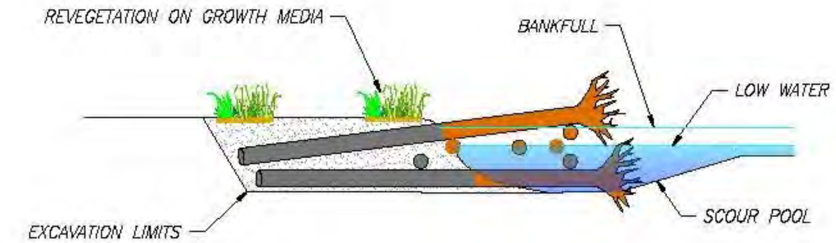
Drawing No.
D–4



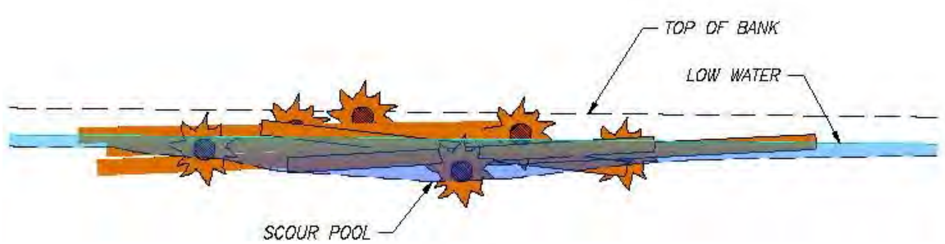
PLAN VIEW



SECTION VIEW B–B'

TIGHT RADIUS JAM STRUCTURE NOTES:

1. INSTALL TIGHT RADIUS JAM STRUCTURES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
3. TIGHT RADIUS JAM STRUCTURES ARE SCALEABLE TO THE SIZE OF STREAM AND MAY CONSIST OF FEWER OR MORE LOGS.
4. BACKFILL USING NATIVE EXCAVATED MATERIAL UNLESS NATIVE MATERIAL IS UNSUITABLE FOR BACKFILL. PLACE BACKFILL IN 1–FOOT MAXIMUM LIFTS. COMPACT EACH LIFT USING MECHANICAL EQUIPMENT SUCH AS AN EXCAVATOR BUCKET OR EQUIPMENT TRACKING.
5. STREAMS LESS THAN 10 FEET WIDE MAY HAVE LOGS PLACED ON THE SURFACE OR BURIED INTO THE BANK.



SECTION VIEW A–A'

EXAMPLE: INSTALLED TIGHT RADIUS JAM STRUCTURE

EXAMPLE: INSTALLED TIGHT RADIUS JAM STRUCTURE

(10) TYPICAL TIGHT RADIUS JAM STRUCTURE

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Typical Details
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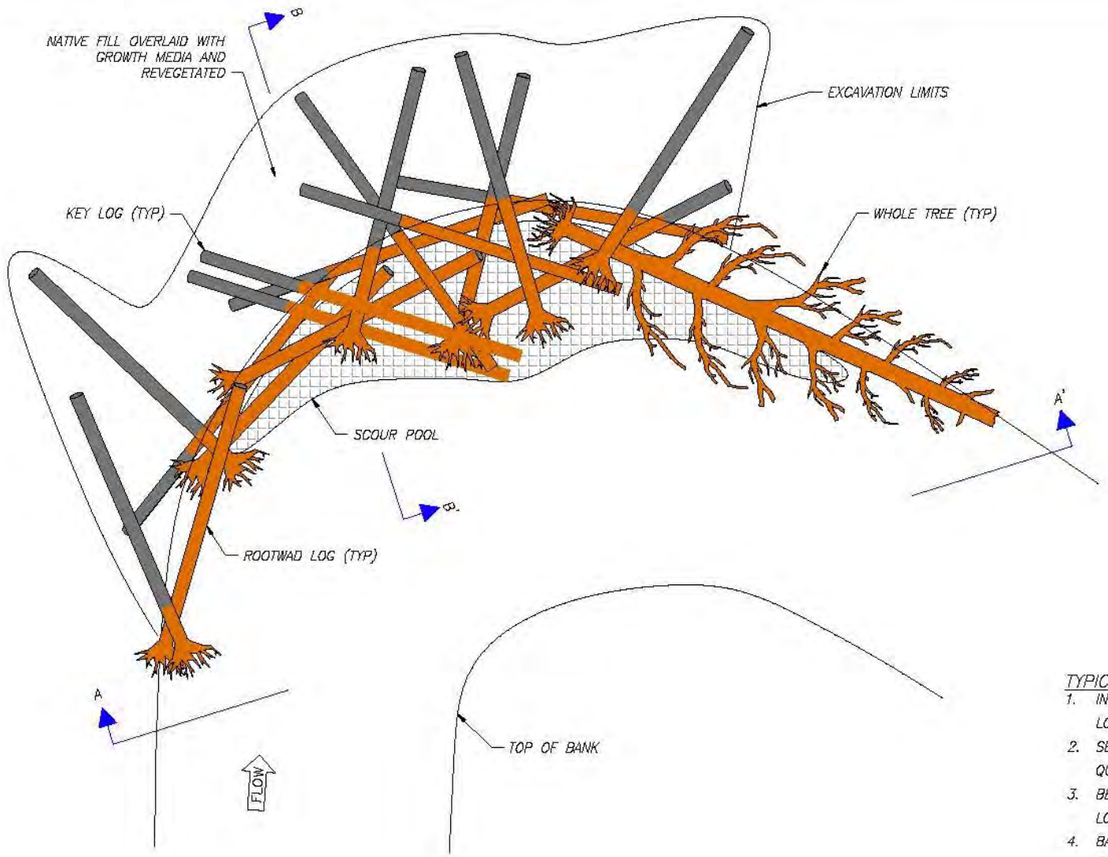
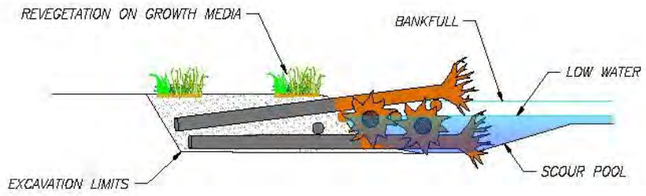


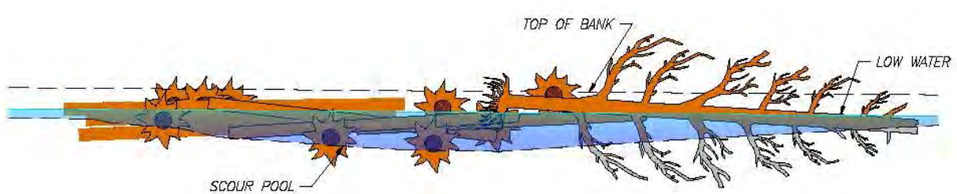
PLAN VIEW



SECTION VIEW B–B'

TYPICAL BEND JAM STRUCTURE NOTES:

1. INSTALL BEND JAM STRUCTURES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
3. BEND JAM STRUCTURES ARE SCALEABLE TO THE SIZE OF STREAM AND MAY CONSIST OF FEWER OR MORE LOGS.
4. BACKFILL USING NATIVE EXCAVATED MATERIAL UNLESS NATIVE MATERIAL IS UNSUITABLE FOR BACKFILL. PLACE BACKFILL IN 1–FOOT MAXIMUM LIFTS. COMPACT EACH LIFT USING MECHANICAL EQUIPMENT SUCH AS AN EXCAVATOR BUCKET OR EQUIPMENT TRACKING.
5. STREAMS LESS THAN 10 FEET WIDE MAY HAVE LOGS PLACED ON THE SURFACE OR BURIED INTO THE BANK.



SECTION VIEW A–A'

11 TYPICAL BEND JAM STRUCTURE

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EXAMPLE: INSTALLED BEND JAM STRUCTURE

EXAMPLE: INSTALLED BEND JAM STRUCTURE

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Typical Details – 6

Drawing No.
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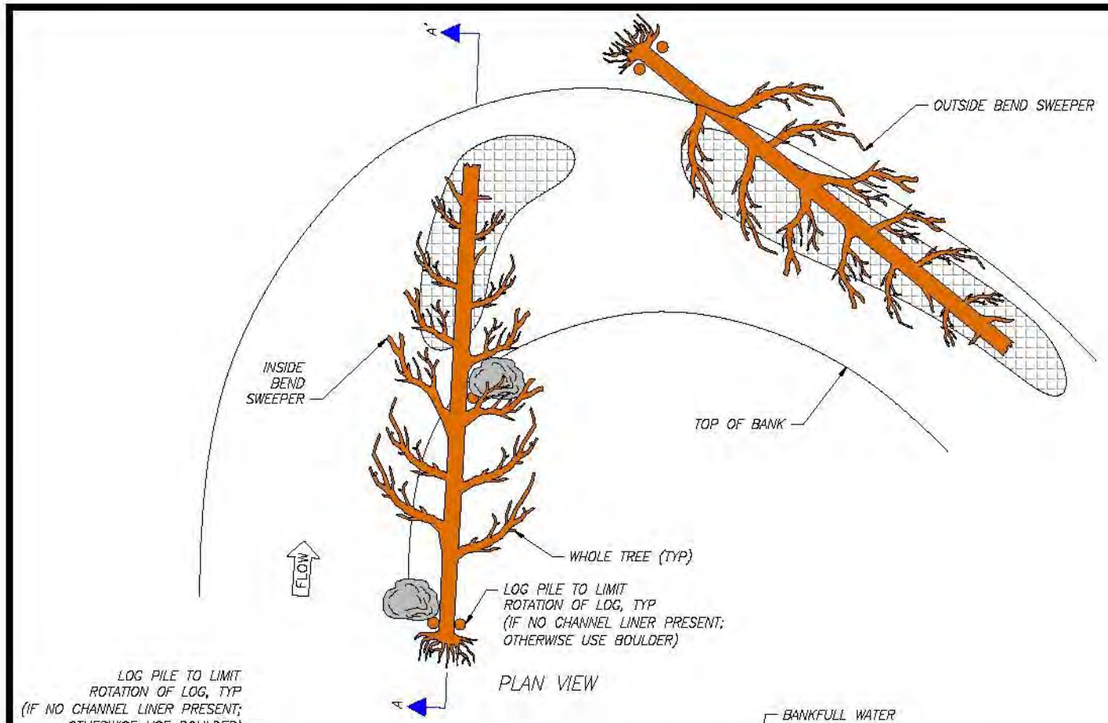

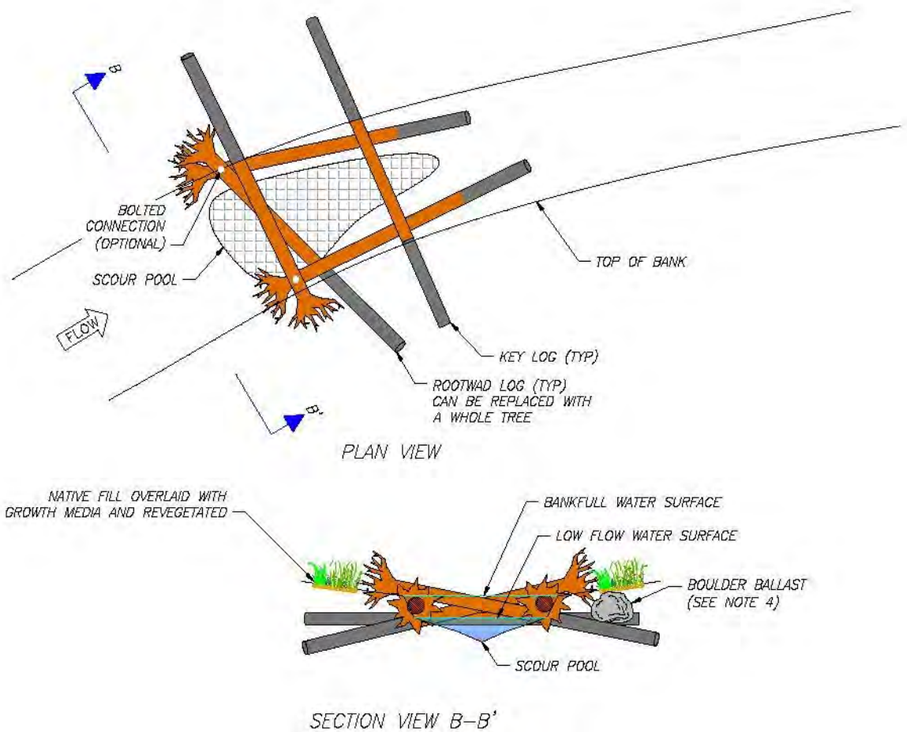

EXAMPLE: INSTALLED TYPICAL SWEEPER LOG STRUCTURE

TYPICAL SWEEPER LOG STRUCTURE NOTES:

1. INSTALL SWEEPER LOG STRUCTURES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
3. LOG PILES MAY BE USED IF NO CHANNEL LINER PRESENT, OTHERWISE USE BOULDER BRACING.
4. STREAMS LESS THAN 10 FEET WIDE MAY HAVE LOGS PLACED ON THE SURFACE WITHOUT PILES.

12 TYPICAL SWEEPER LOG STRUCTURE
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EXAMPLE: INSTALLED CHANNEL SPANNING JAM STRUCTURE

CHANNEL SPANNING JAM STRUCTURE NOTES:

1. INSTALL CHANNEL SPANNING JAM STRUCTURES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
3. PROVIDE BOLTED CONNECTIONS AT SPECIFIED LOCATIONS.
4. PROVIDE FOR BOULDER BALLAST IF SPECIFIED MINIMUM COVER OVER KEY LOGS NOT POSSIBLE.
5. STREAMS LESS THAN 10 FEET WIDE MAY HAVE LOGS PLACED ON THE SURFACE OR BURIED INTO THE BANK.

13 TYPICAL CHANNEL SPANNING JAM STRUCTURE
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Drawing No.
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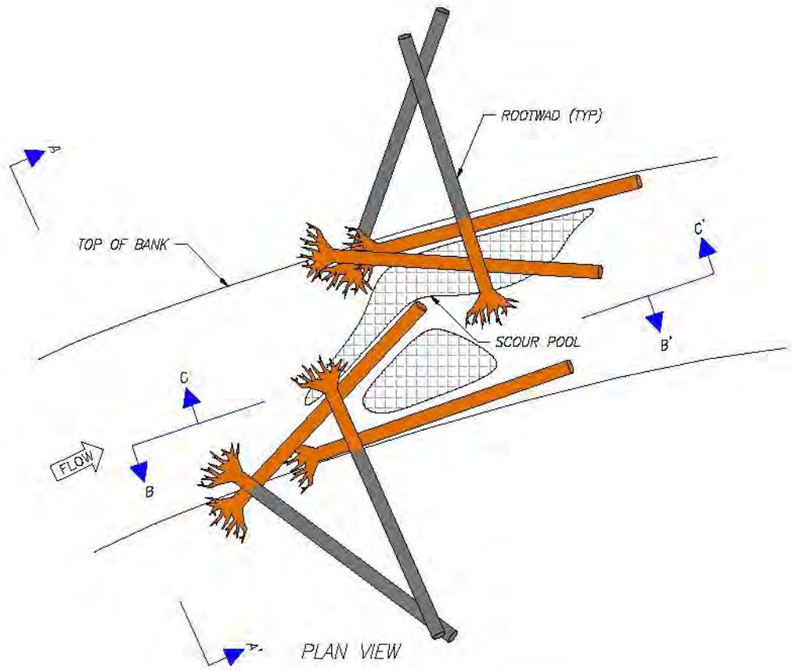
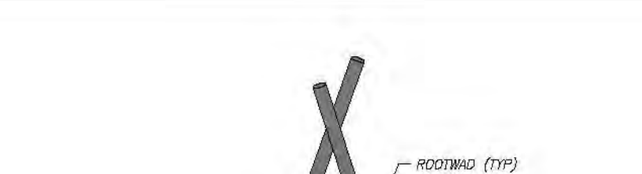
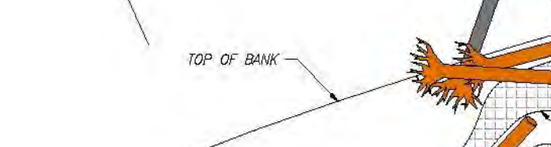
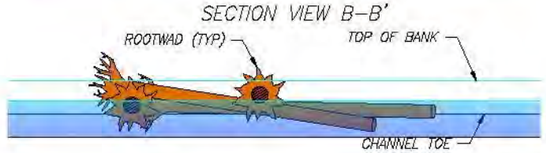




SECTION VIEW A–A'



SECTION VIEW B–B'



SECTION VIEW C–C'

TYPICAL WOOD HABITAT STRUCTURE NOTES:

1. INSTALL WOOD HABITAT STRUCTURES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
3. PROVIDE FOR BOULDER BALLAST IF SPECIFIED MINIMUM COVER OVER KEY LOGS NOT POSSIBLE.
4. STREAMS LESS THAN 10 FEET WIDE MAY HAVE LOGS PLACED ON THE SURFACE OR BURIED INTO THE BANK.

14 TYPICAL WOOD HABITAT STRUCTURE
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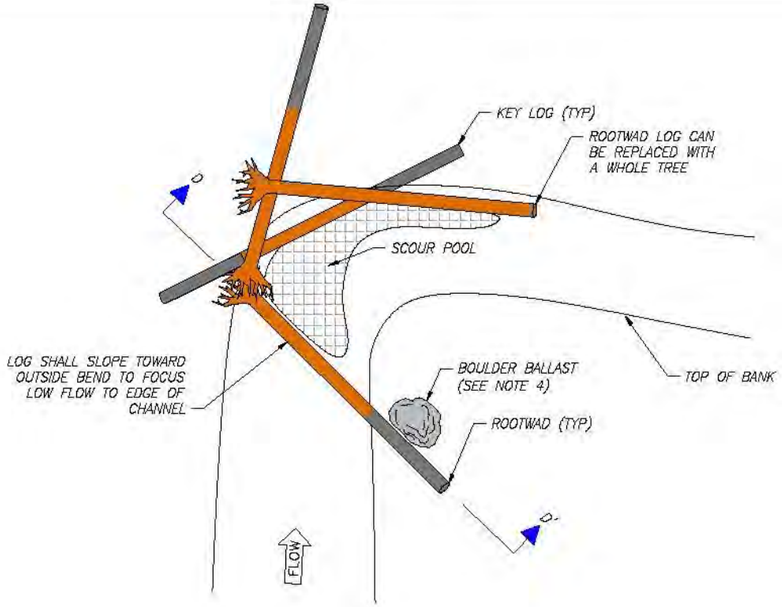
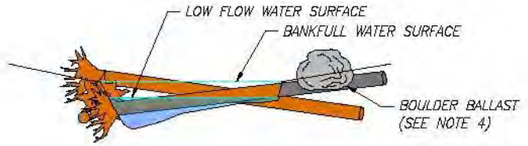


PLAN VIEW



SECTION VIEW D–D'

EXAMPLE: NATURAL TURNING LOG STRUCTURE

TYPICAL TURNING LOG STRUCTURE NOTES:

1. INSTALL TURNING LOG STRUCTURES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
3. PROVIDE FOR BOULDER BALLAST IF SPECIFIED MINIMUM COVER OVER KEY LOGS NOT POSSIBLE.
4. STREAMS LESS THAN 10 FEET WIDE MAY HAVE LOGS PLACED ON THE SURFACE OR BURIED INTO THE BANK.

15 TYPICAL TURNING LOG STRUCTURE
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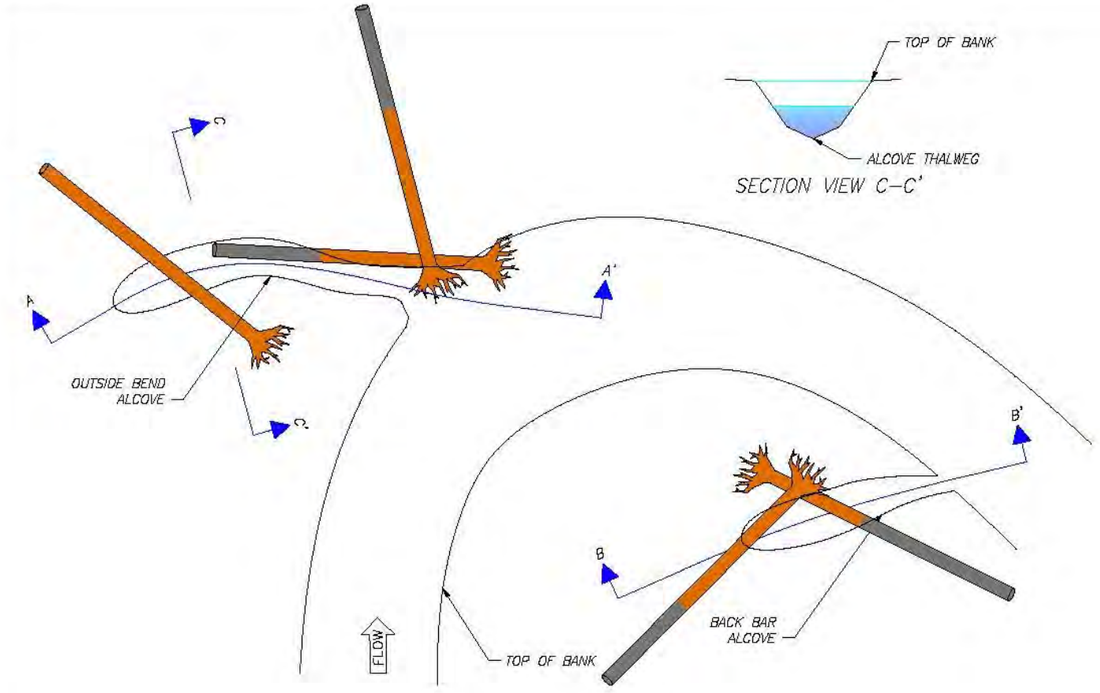

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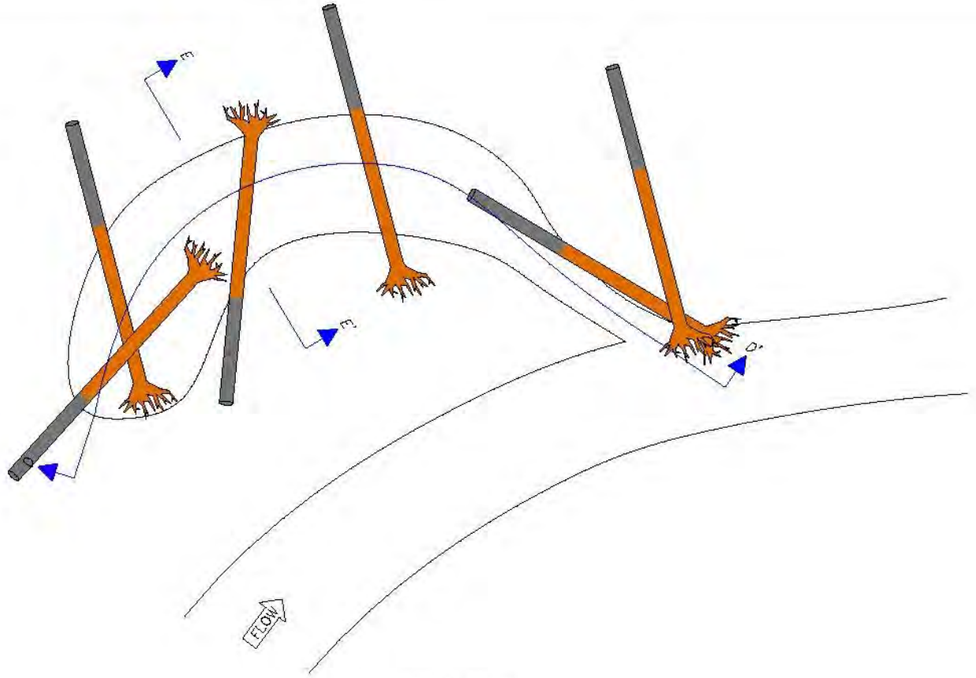

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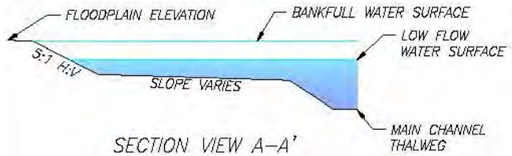
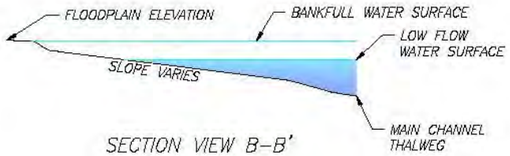
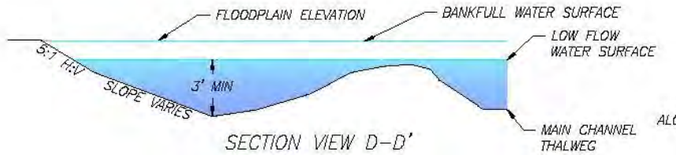


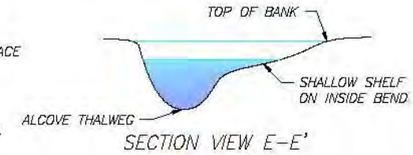
SECTION VIEW A–A'



SECTION VIEW B–B'



SECTION VIEW D–D'



SECTION VIEW E–E'

EXAMPLE: CONSTRUCTED BACKWATER ALCOVE

TYPICAL BACKWATER ALCOVE NOTES:

1. INSTALL BACKWATER ALCOVES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
3. BACKWATER ALCOVES SHALL BE INSTALLED PER THE APPROPRIATE SECTION VIEW (OUTSIDE BEND OR BACK BAR). MORE DETAIL (REACH SPECIFIC DIMENSIONS) WILL BE DETERMINED IN A FUTURE DESIGN PHASE.
4. STREAMS LESS THAN 10 FEET WIDE CAN HAVE LOGS PLACED ON TOP OF THE SURFACE OR BURIED INTO THE BANK.
5. BURIED LOGS CAN BE REPLACED WITH UNBURIED WHOLE TREES (INCLUDING BRANCHES AND LIMBS).

16 TYPICAL BACKWATER ALCOVE
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EXAMPLE: CONSTRUCTED BACKWATER ALCOVE

TYPICAL OXBOW BACKWATER ALCOVE NOTES:

1. INSTALL OXBOW BACKWATER ALCOVES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
3. OXBOW BACKWATER ALCOVES SHALL BE INSTALLED PER THE SECTION VIEW. MORE DETAIL (REACH SPECIFIC DIMENSIONS) WILL BE DETERMINED IN A FUTURE DESIGN PHASE.
4. STREAMS LESS THAN 10 FEET WIDE CAN HAVE LOGS PLACED ON TOP OF THE SURFACE OR BURIED INTO THE BANK.
5. BURIED LOGS CAN BE REPLACED WITH UNBURIED WHOLE TREES (INCLUDING BRANCHES AND LIMBS).

17 TYPICAL OXBOW BACKWATER ALCOVE
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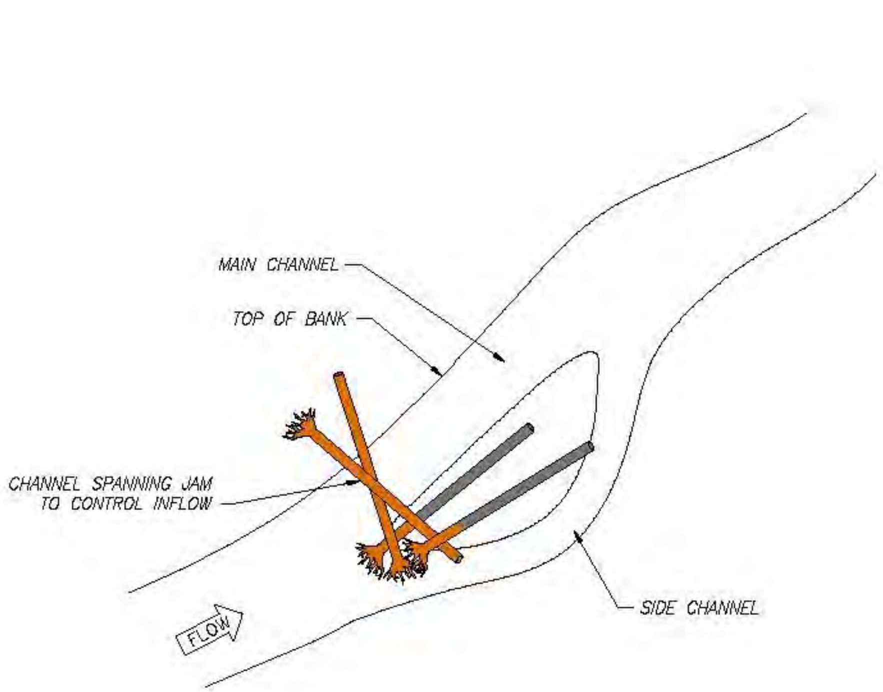
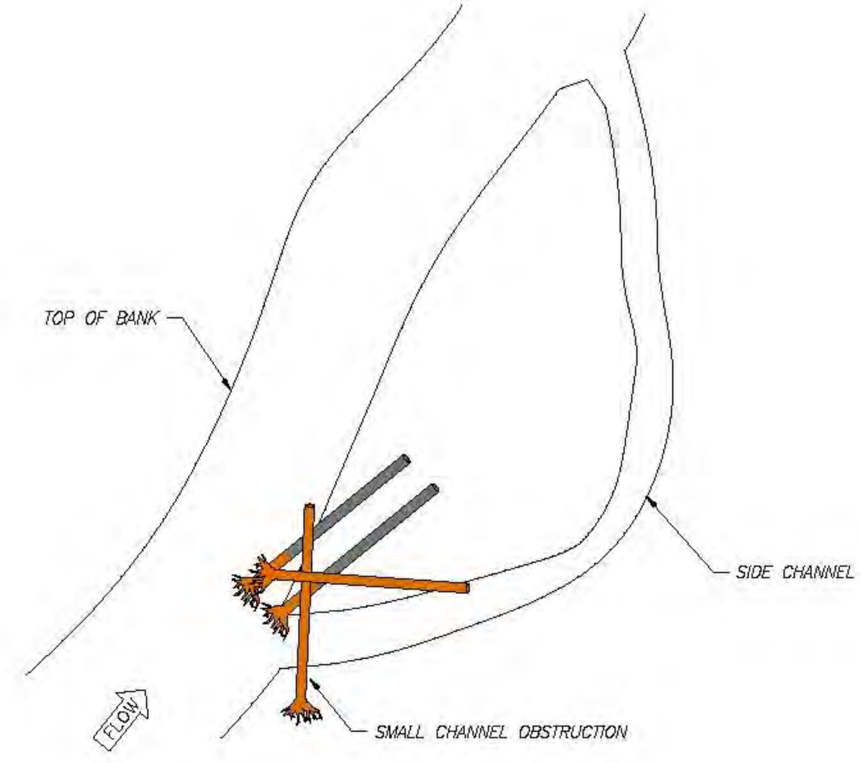
D–9



PLAN VIEW



PLAN VIEW

EXAMPLE: CONSTRUCTED SPLIT SIDE CHANNEL

SPLIT FLOW SIDE CHANNEL NOTES:

1. TARGET FLOW IN SPLIT FLOW SIDE CHANNEL IS 40% OF TOTAL FLOW.
2. LENGTH OF SPLIT FLOW SIDE CHANNEL SHALL BE LESS THAN 4 BANKFULL WIDTHS.
3. INSTALL SPLIT FLOW SIDE CHANNELS AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
4. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
5. SPLIT FLOW SIDE CHANNELS SHALL HAVE A FLATTER GRADIENT THAN THE ADJACENT MAIN CHANNEL.
6. SPLIT FLOW SIDE CHANNELS CAN BE PERENNIAL OR DESIGNED TO ACTIVATE ONLY AT HIGH FLOW.
7. LENGTH OF SPLIT FLOW SIDE CHANNEL IS TYPICALLY LESS THAN SIDE CHANNEL ELEMENTS (SEE DETAIL THIS SHEET).

(18) TYPICAL SPLIT FLOW SIDE CHANNEL

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EXAMPLE: CONSTRUCTED SIDE CHANNEL (MAIN CHANNEL IN BACKGROUND)

SIDE CHANNEL NOTES:

1. TARGET FLOW IN SIDE CHANNEL IS 20% OF TOTAL FLOW.
2. LENGTH OF SIDE CHANNEL SHALL BE LONGER THAN 4 BANKFULL WIDTHS.
3. INSTALL SIDE CHANNELS AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
4. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
5. SIDE CHANNELS SHALL HAVE A FLATTER GRADIENT THAN THE ADJACENT MAIN CHANNEL.
6. SIDE CHANNELS CAN BE DESIGNED TO BE PERENNIAL OR ACTIVATE ONLY AT HIGH FLOW.
7. LENGTH OF SIDE CHANNELS IS TYPICALLY GREATER THAN SPLIT FLOW SIDE CHANNEL ELEMENTS (SEE DETAIL THIS SHEET).

(19) TYPICAL SIDE CHANNEL

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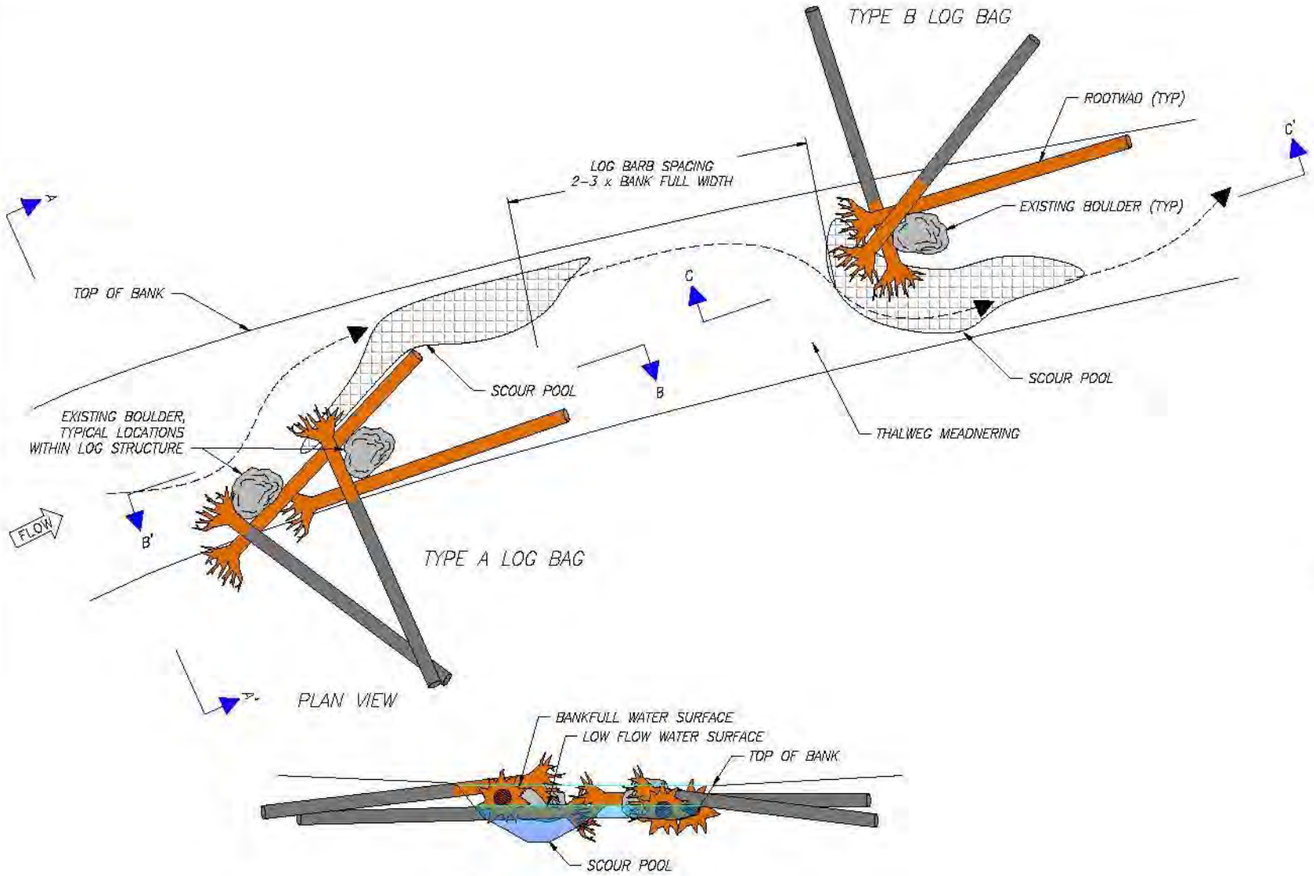

TYPICAL LOG BANK JAM STRUCTURE NOTES:

1. INSTALL LOG BANK JAM STRUCTURES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
3. PROVIDE FOR BOULDER BALLAST IF SPECIFIED MINIMUM COVER OVER KEY LOGS NOT POSSIBLE.
4. STREAMS LESS THAN 10 FEET WIDE MAY HAVE LOGS PLACED ON THE SURFACE OR BURIED INTO THE BANK.
5. LOG BARB SPACING 2-5 BANK FULL WIDTH.

STRUCTURE INTENT:

1. UTILIZE EXISTING BOULDERS AND/OR LIVE TREES TO STRATEGICALLY BRACE LOGS DEFINING THE THALWEG, FORCING POOL FORMATION, RETAINING GRAVEL, AND PROVIDING IN-STREAM VELOCITY REFUGE.
2. ALTERNATING BANK JAMS PROMOTE THALWEG DEVELOPMENT AND CHANNEL SINUOSITY.
3. TYPE A AND B STRUCTURES CAN BE INSTALLED ON EITHER LEFT OR RIGHT BANK.

20 TYPICAL ALTERNATING LOG BANK JAMS

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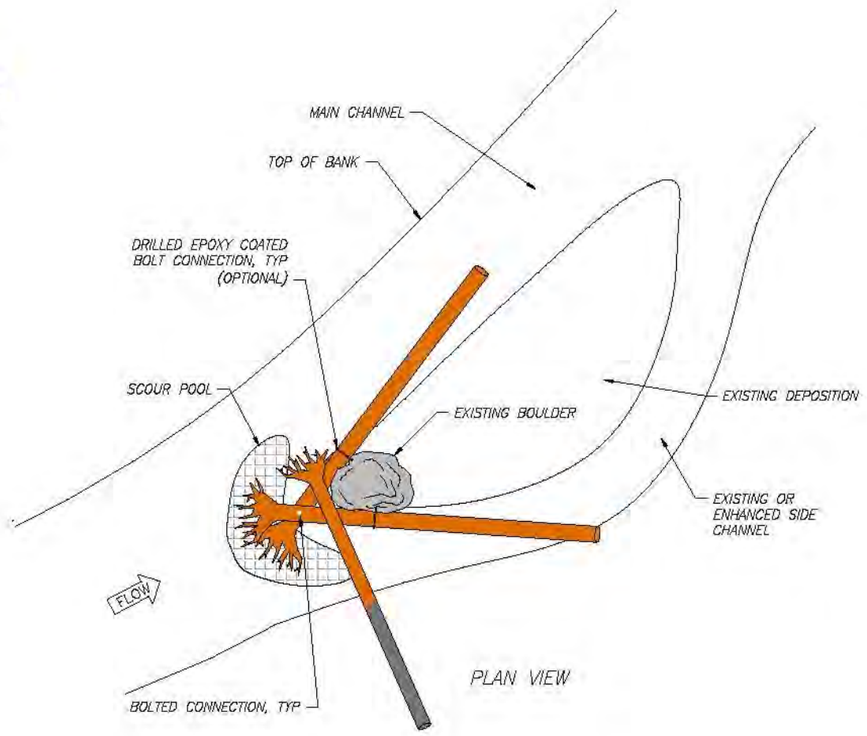

EXISTING BOULDER APEX JAM STRUCTURE NOTES:

1. INSTALL EXISTING BOULDER APEX JAM STRUCTURES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
3. SMALL APEX JAM STRUCTURES ARE SCALEABLE TO THE SIZE OF STREAM AND MAY CONSIST OF FEWER OR MORE LOGS INCLUDING FEWER KEY LOGS.
3. PROVIDE FOR BOULDER BALLAST IF SPECIFIED MINIMUM COVER OVER KEY LOGS NOT POSSIBLE.
4. STREAMS LESS THAN 10 FEET WIDE MAY HAVE LOGS PLACED ON THE SURFACE OR BURIED INTO THE BANK.

STRUCTURE INTENT:

1. UTILIZE EXISTING BOULDERS AND/OR LIVE TREES TO STRATEGICALLY BRACE LOGS DEFINING THE THALWEG, FORCING POOL FORMATION, FORCING SIDE CHANNEL DEVELOPMENT, RETAINING GRAVEL, AND PROVIDING IN-STREAM VELOCITY REFUGE.

21 TYPICAL EXISTING BOULDER APEX JAM

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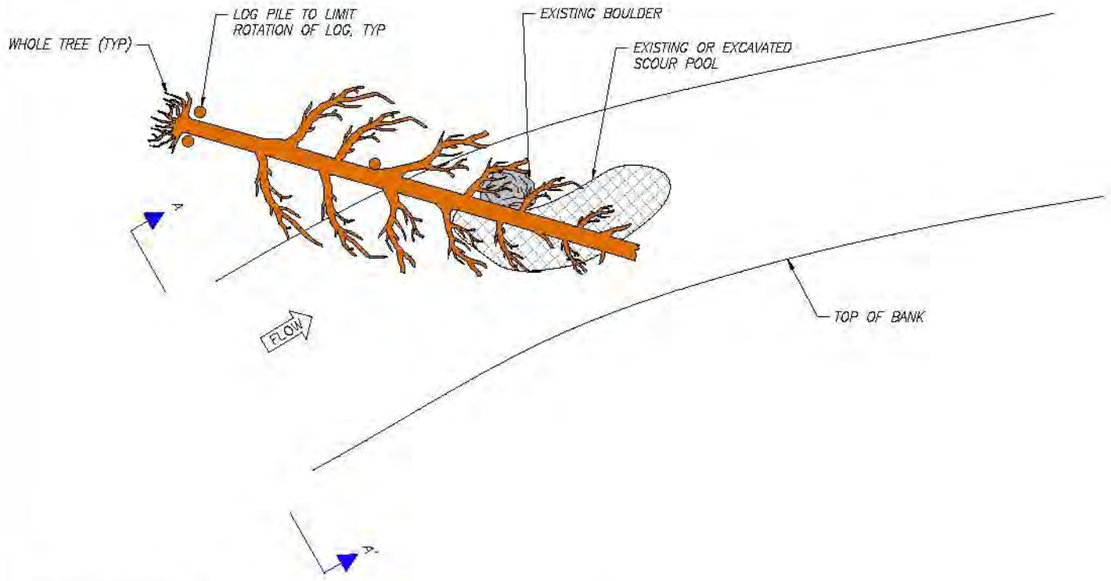

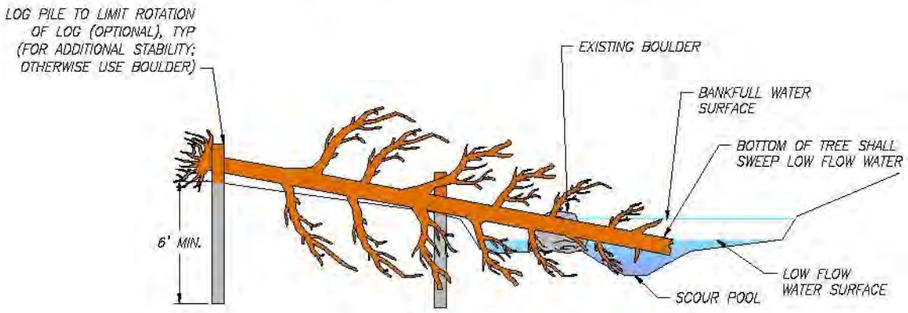

SECTION VIEW A–A'

WHOLE TREE HABITAT STRUCTURE NOTES:

1. INSTALL WHOLE TREE HABITAT STRUCTURES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
3. LOG PILES MAY BE USED IF NO CHANNEL LINER PRESENT, OTHERWISE USE BOULDER BRACING.
4. STREAMS LESS THAN 10 FEET WIDE MAY HAVE LOGS PLACED ON THE SURFACE WITHOUT PILES.
5. BRACE AGAINST EXISTING BOULDERS OR VEGETATION OR INSTALL WOOD PILES (OPTIONAL) FOR ADDITIONAL STABILITY.

STRUCTURE INTENT:

1. UTILIZE EXISTING BOULDERS AND SCOUR POOLS AND ENHANCE WITH WHOLE TREES. STRATEGICALLY BRACE LOGS AGAINST EXISTING BOULDERS AND LIVE TREES, FORCING POOL FORMATION, RETAINING GRAVEL, AND PROVIDING IN–STREAM VELOCITY REFUGE.

22 TYPICAL WHOLE TREE HABITAT STRUCTURE

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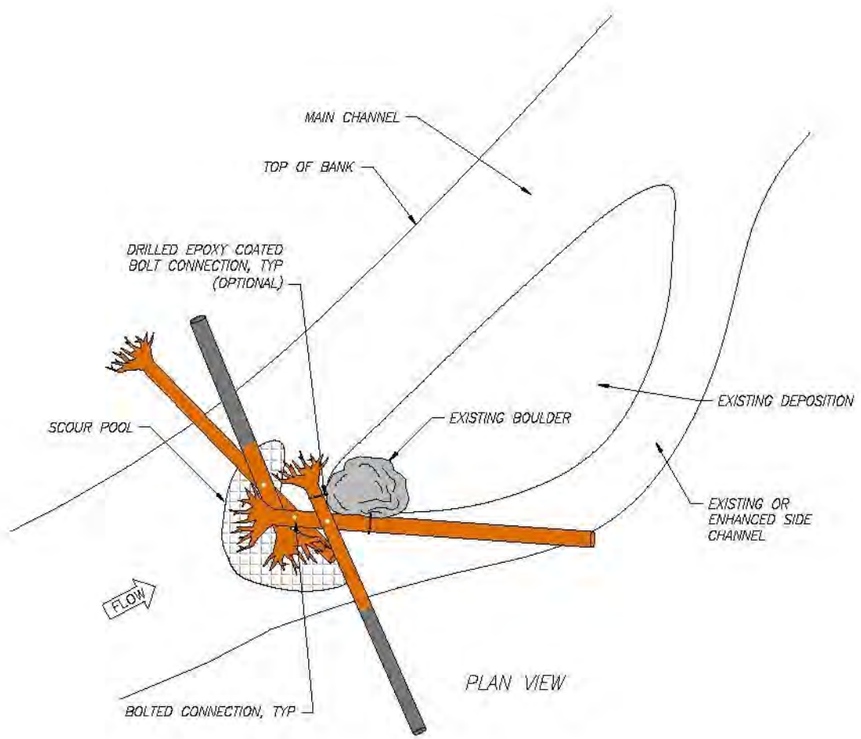

PLAN VIEW

EXISTING BOULDER APEX JAM STRUCTURE NOTES:

1. INSTALL EXISTING BOULDER APEX JAM STRUCTURES AT LOCATIONS IDENTIFIED ON PLAN OVERVIEW SHEETS FOR EACH REACH OR AT LOCATIONS DETERMINED BY THE OWNER OR ENGINEER AT THE SPECIFIED STRUCTURE QUANTITY.
2. SEE INDIVIDUAL REACH QUANTITY SHEETS FOR NUMBER OF STRUCTURES, LOGS, AND ASSOCIATED MATERIAL QUANTITIES.
3. SMALL APEX JAM STRUCTURES ARE SCALEABLE TO THE SIZE OF STREAM AND MAY CONSIST OF FEWER OR MORE LOGS INCLUDING FEWER KEY LOGS.
3. PROVIDE FOR BOULDER BALLAST IF SPECIFIED MINIMUM COVER OVER KEY LOGS NOT POSSIBLE.
4. STREAMS LESS THAN 10 FEET WIDE MAY HAVE LOGS PLACED ON THE SURFACE OR BURIED INTO THE BANK.

STRUCTURE INTENT:

1. UTILIZE EXISTING BOULDERS AND/OR LIVE TREES TO STRATEGICALLY BRACE LOGS DEFINING THE THALWEG, FORCING POOL FORMATION, FORCING SIDE CHANNEL DEVELOPMENT, RETAINING GRAVEL, AND PROVIDING IN–STREAM VELOCITY REFUGE.

23 TYPICAL EXISTING BOULDER CHANNEL SPANNING JAM

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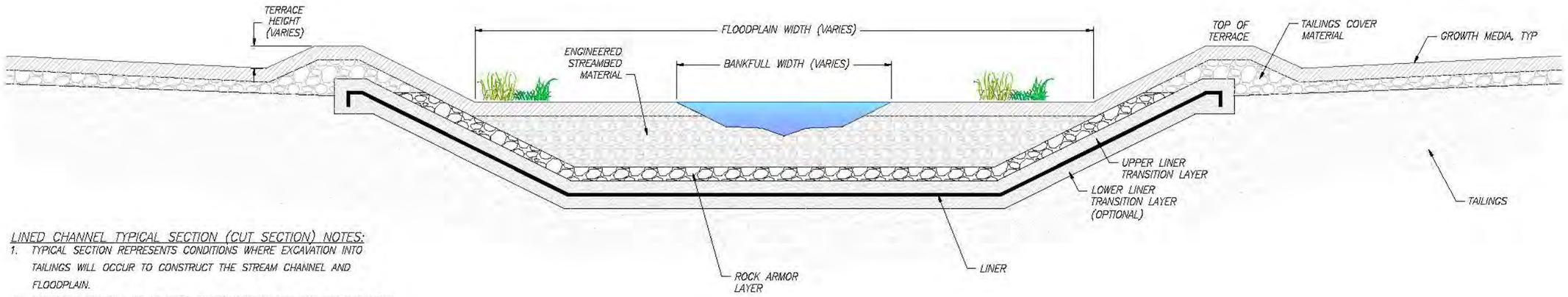
Drawing Name
Typical Details – 12

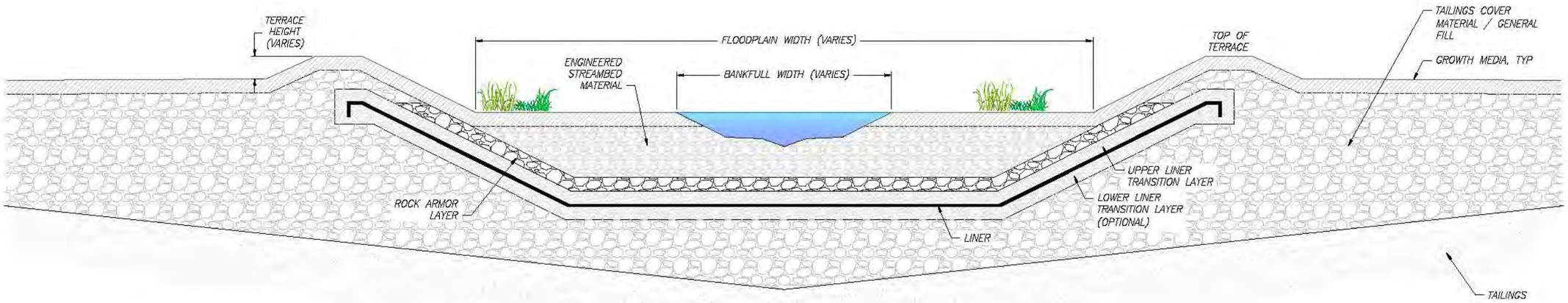
Drawing No.
D–12



LINED CHANNEL TYPICAL SECTION (CUT SECTION) NOTES:

1. TYPICAL SECTION REPRESENTS CONDITIONS WHERE EXCAVATION INTO TAILINGS WILL OCCUR TO CONSTRUCT THE STREAM CHANNEL AND FLOODPLAIN.
2. ASSUMED MAXIMUM OF 15 FEET OF EXCAVATION INTO THE TAILINGS NEAR THE DOWNSTREAM END (DAM FACE).
3. ASSUMED MAXIMUM OF 5 FEET OF EXCAVATION INTO THE TAILINGS ELSEWHERE.

LINED CHANNEL TYPICAL SECTION
– CUT SECTION



LINED CHANNEL TYPICAL SECTION (FILL SECTION) NOTES:

1. TYPICAL SECTION REPRESENTS CONDITIONS WHERE STREAM CHANNEL AND FLOODPLAIN WILL BE CONSTRUCTED ON FILL PLACED ABOVE TAILINGS.
2. EXCAVATION MAY BE REQUIRED INTO THE TAILINGS COVER MATERIAL.

LINED CHANNEL TYPICAL SECTION
– FILL SECTION

24 LINED CHANNEL TYPICAL SECTIONS (ON TOP OF TSF)

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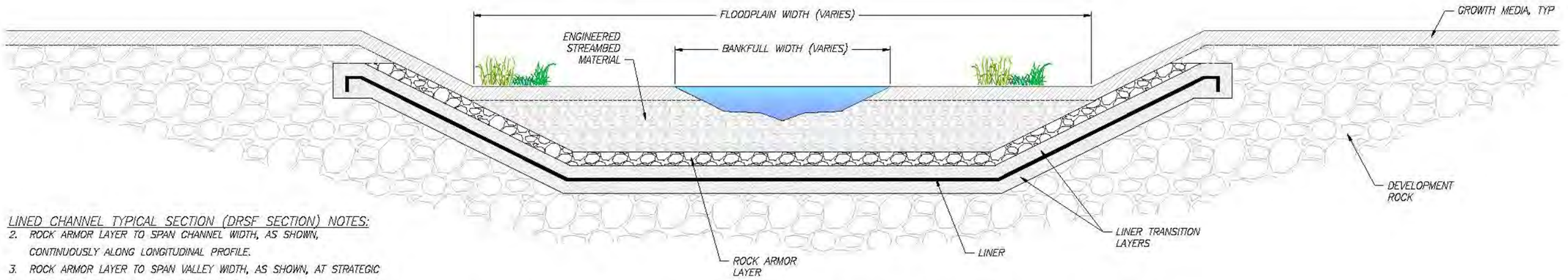
Drawing No.
D-13

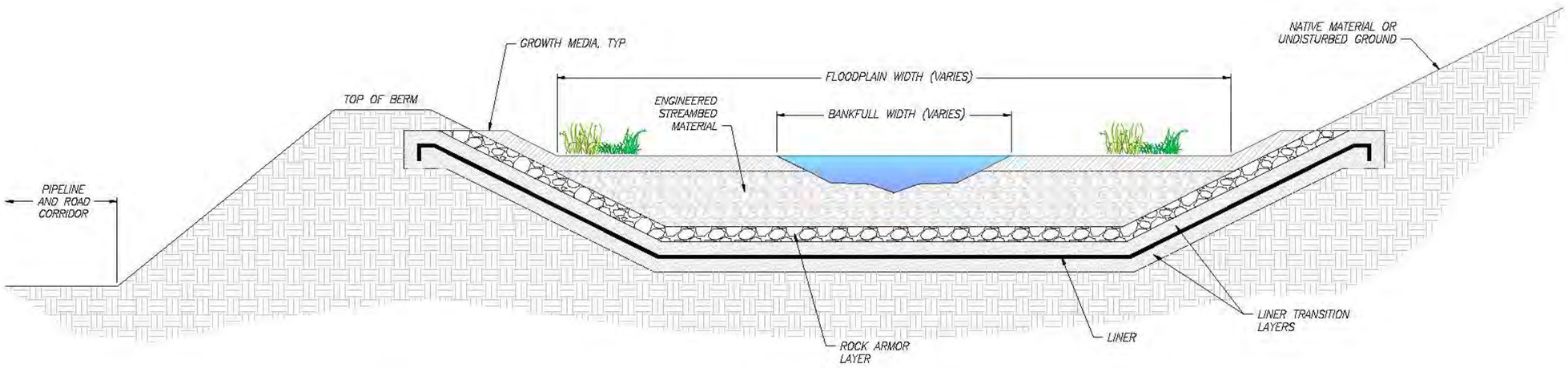


LINED CHANNEL TYPICAL SECTION (DRSF SECTION) NOTES:

2. ROCK ARMOR LAYER TO SPAN CHANNEL WIDTH, AS SHOWN, CONTINUOUSLY ALONG LONGITUDINAL PROFILE.
3. ROCK ARMOR LAYER TO SPAN VALLEY WIDTH, AS SHOWN, AT STRATEGIC LOCATIONS (TBD) ALONG LONGITUDINAL PROFILE.

25 LINED CHANNEL TYPICAL SECTION (ON TOP OF DRSF)

NTS



26 LINED CHANNEL TYPICAL SECTION (MC4 AND MC5 DIVERSION CHANNEL)

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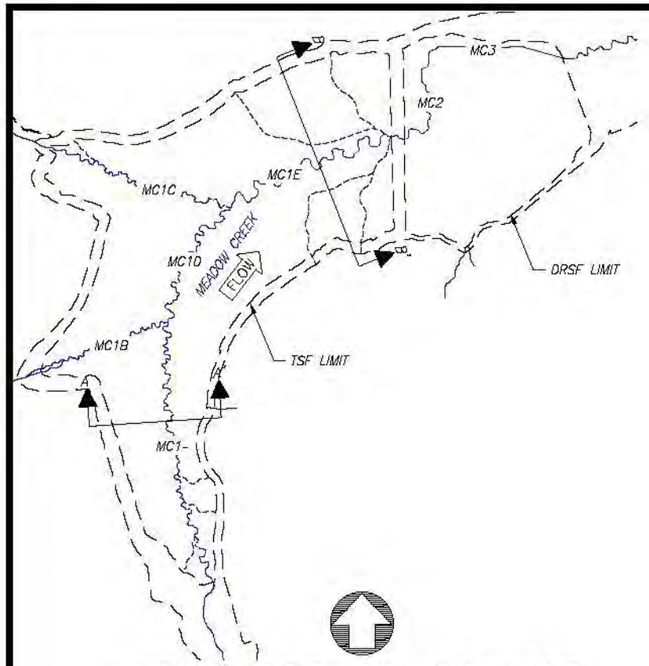
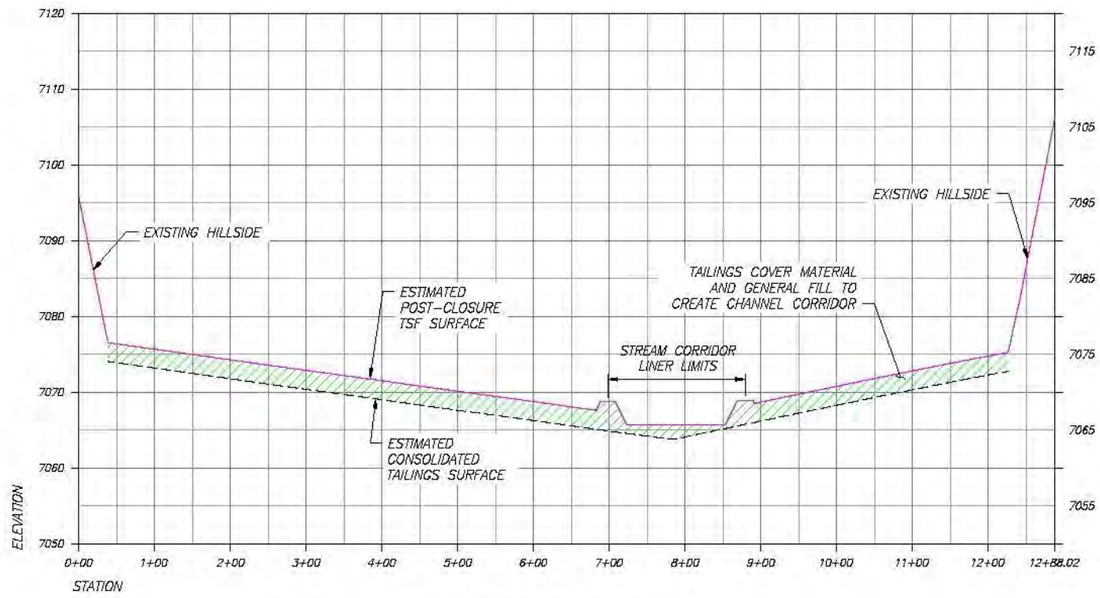
D–14



TSF/DRSF VICINITY MAP

1" = 1,000'



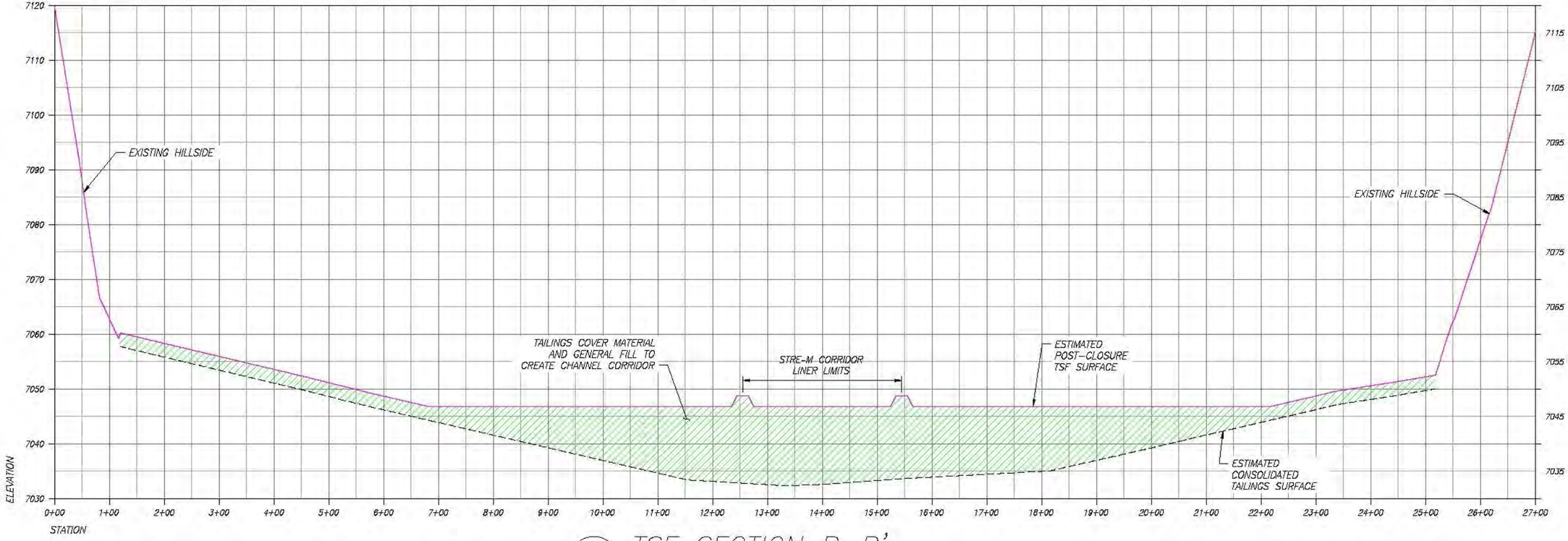
27 TSF SECTION A-A'

NOTES:

1. SECTIONS ARE CUT LEFT TO RIGHT LOOKING DOWNSTREAM ON THE TSF IN THE MEADOW CREEK DRAINAGE.
2. REFER TO SHEET D-13, DETAIL 24 – LINED CHANNEL TYPICAL SECTIONS (ON TOP OF TSF) FOR ADDITIONAL CHANNEL CORRIDOR DETAIL.
3. REFER TO SHEET MC1A-2 AND MC1E-1 FOR STREAM DESIGN AT SECTION LOCATIONS.

LEGEND:

- ESTIMATED TSF CONSOLIDATED GROUND PROFILE
- ESTIMATED POST-CLOSURE TSF GROUND PROFILE
- FILL ZONE



28 TSF SECTION B-B'

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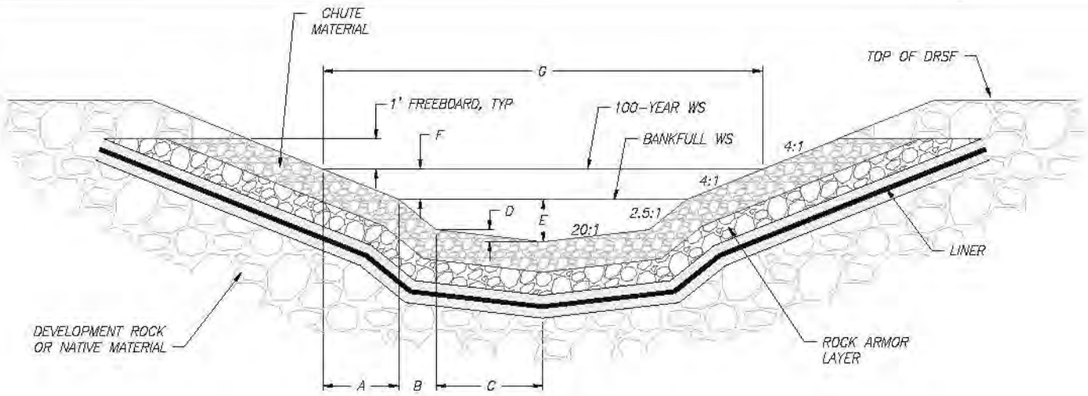
Drawing No.
D-15



SECTION VIEW

LINED RIPRAP CHUTE CHANNEL DEFINITION TABLE

TABLE – A												
REACH ID	100-YR FLOW (CFS)	CHUTE MATERIAL TYPE	CHUTE MATERIAL THICKNESS (IN)	ROCK ARMOR MATERIAL TYPE	ROCK ARMOR MATERIAL THICKNESS (FT)	A (FT)	B (FT)	C (FT)	D (FT)	BANKFULL DEPTH, E (FT)	F (FT)	TOP WIDTH, G (FT)
MC3	243	C1	4.0	A2	2.0	3.6	4.8	2.8	0.1	2.0	0.9	23.6
FC2	43	C2	3.0	A2	2.0	1.2	2.0	2.0	0.2	1.0	0.3	11.1
WE2	5	C2	3.0	A2	2.0	1.2	1.5	0.0	0.0	0.6	0.3	5.4

NOTES
1. CHUTE MATERIAL TYPES: C1 (D50 = XX"), C2 (D50 = XX").
2. ROCK ARMOR MATERIAL TYPES: A1 (D50 = XX"), A2 (D50 = XX").

29 LINED RIPRAP CHUTE
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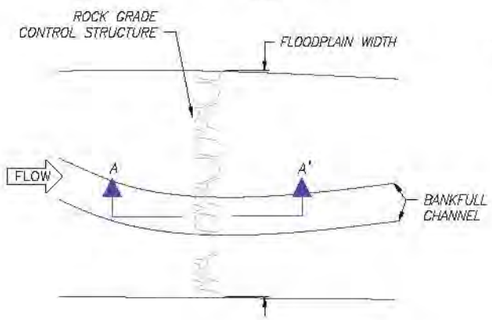
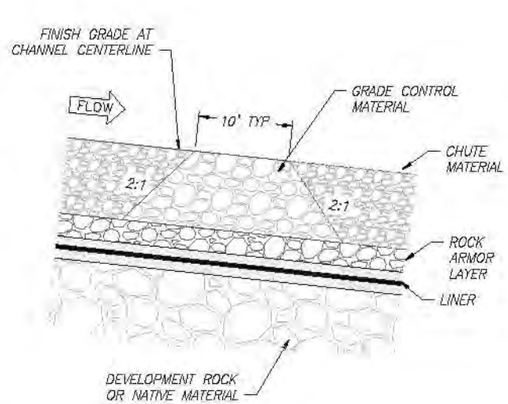


PLAN VIEW



SECTION A–A'

NOTES
1. CONSTRUCT ROCK GRADE CONTROL STRUCTURES TO THE DIMENSIONS SPECIFIED IN THE LINED RIPRAP CHUTE DETAIL (THIS DRAWING).
2. ROCK GRADE CONTROL MATERIAL SHALL CONSIST OF MATERIAL MATCHING THE ROCK ARMOR LAYER FOR THE SAME REACH.

31 ROCK GRADE CONTROL STRUCTURE
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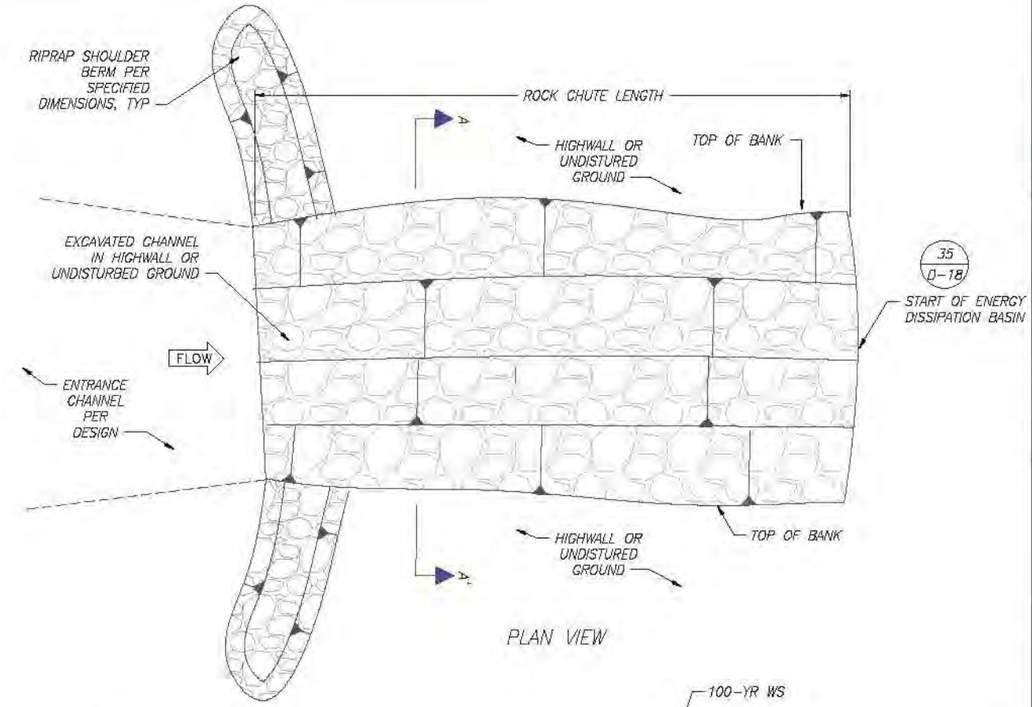
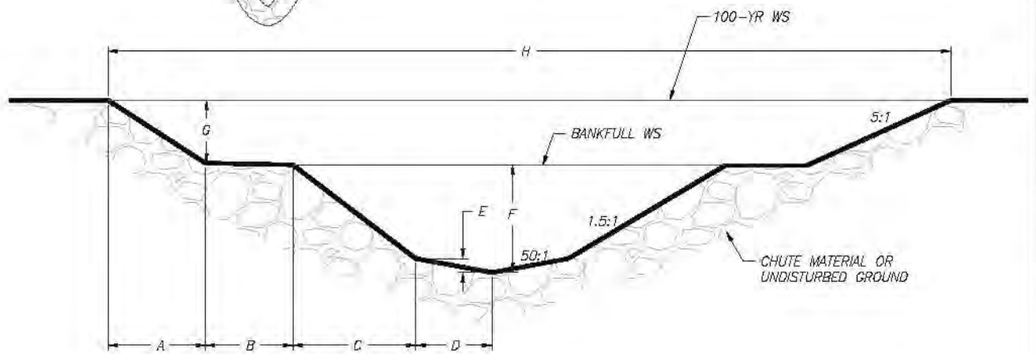


PLAN VIEW



SECTION VIEW A–A'

UNLINED CHUTE CHANNEL DEFINITION TABLE

TABLE – A												
REACH ID	DESIGN EVENT	FLOW (CFS)	CHUTE MATERIAL TYPE	CHUTE MATERIAL THICKNESS (FT)	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)	F (FT)	G (FT)	H (FT)
HC1	100-YR	14	NATIVE BEDROCK	NA	0.2	0.0	0.8	1.0	0	0.3	.2	2.7
WE3	100-YR	15	C2	2.0	2.5	0.0	0.8	2.0	0.1	0.6	0.5	10.5

NOTES
1. CHUTE MATERIAL TYPES: C1 (D50 = XX"), C2 (D50 = XX").

30 UNLINED CHUTE
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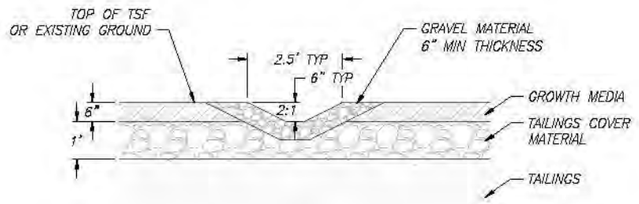
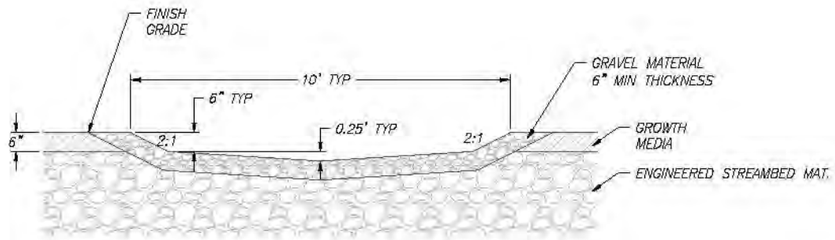
D-16



SECTION VIEW

32 NON–PERENNIAL SWALE

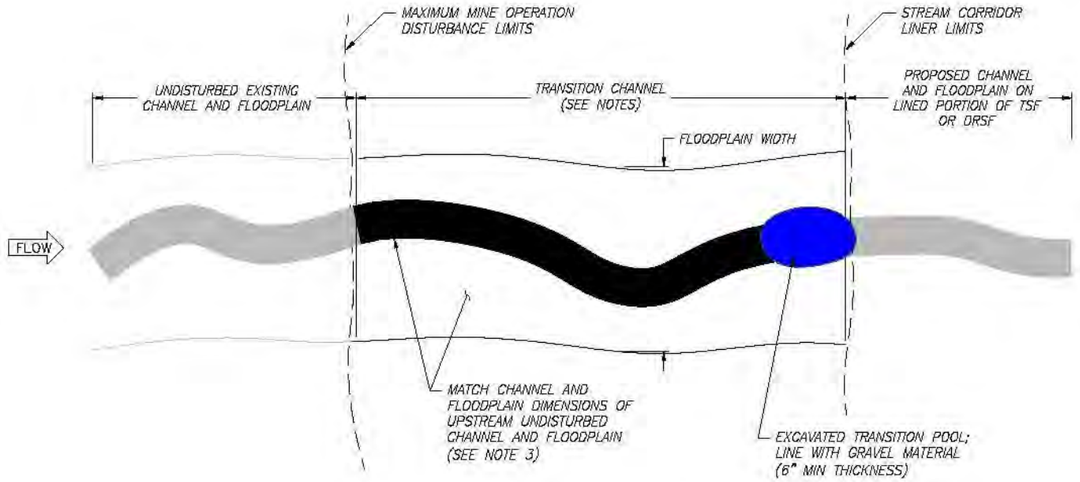
NTS



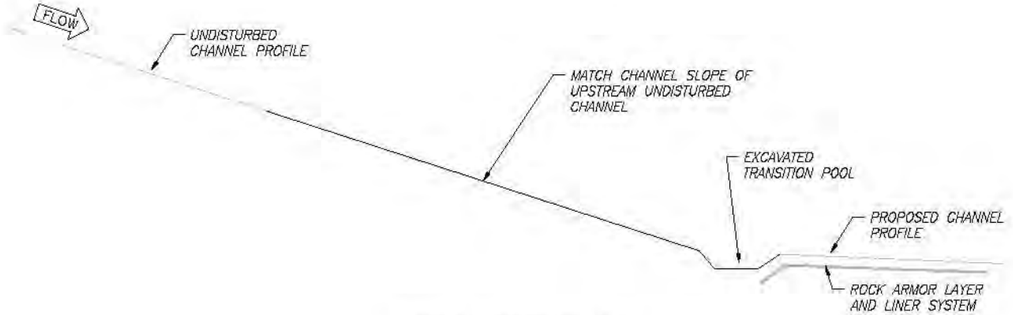
SECTION VIEW

33 HIGH FLOW NON–PERENNIAL CHANNEL

NTS



TYPICAL PLAN VIEW



TYPICAL PROFILE VIEW

TRANSITION CHANNEL NOTES:

1. TRANSITION CHANNELS SHALL BE LOCATED IN THE REGION BETWEEN STREAM CORRIDOR LINER LIMITS (ON TSF OR DRSF) AND THE MAXIMUM MINE OPERATION DISTURBANCE LIMITS AT LOCATIONS WHERE AN EXISTING (PERENNIAL OR NON–PERENNIAL) IS DISTURBED BY MINE OPERATIONS (RESTORATION OF ACCESS ROADS AND DIVERSION CHANNELS OR ANY OTHER DISTURBANCE).
2. TRANSITION CHANNELS SHALL ALSO BE LOCATED ON PERENNIAL AND NON–PERENNIAL CHANNEL AT LOCATIONS IDENTIFIED ON THE PLAN OVERVIEW SHEETS FOR EACH REACH AND AT LOCATIONS AS DETERMINED BY THE OWNER OR ENGINEER.
3. RE–CONTOUR CHANNEL AND FLOODPLAIN AREA TO ACHIEVE SMOOTH TRANSITION BETWEEN UPSTREAM UNDISTURBED CHANNEL AND DOWNSTREAM PROPOSED CHANNEL (OR DOWNSTREAM EXISTING UNDISTURBED CHANNEL IN SOME CASES; TYPICAL DETAIL SHOWN REPRESENTS TRANSITION AT LINER LIMITS).

34 TRANSITIONAL CHANNEL

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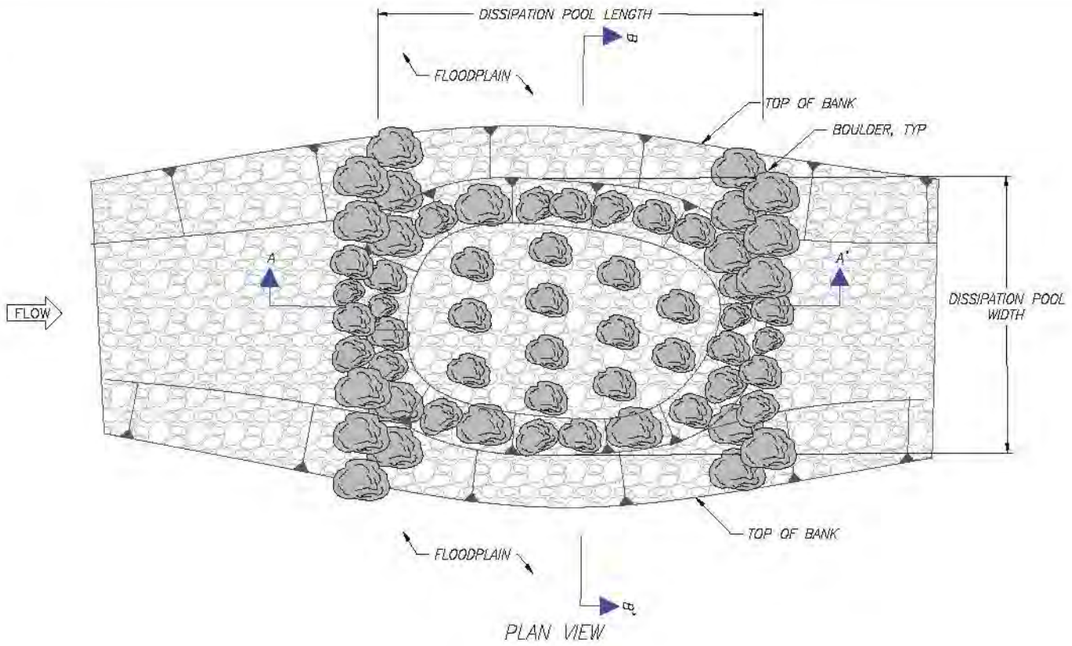
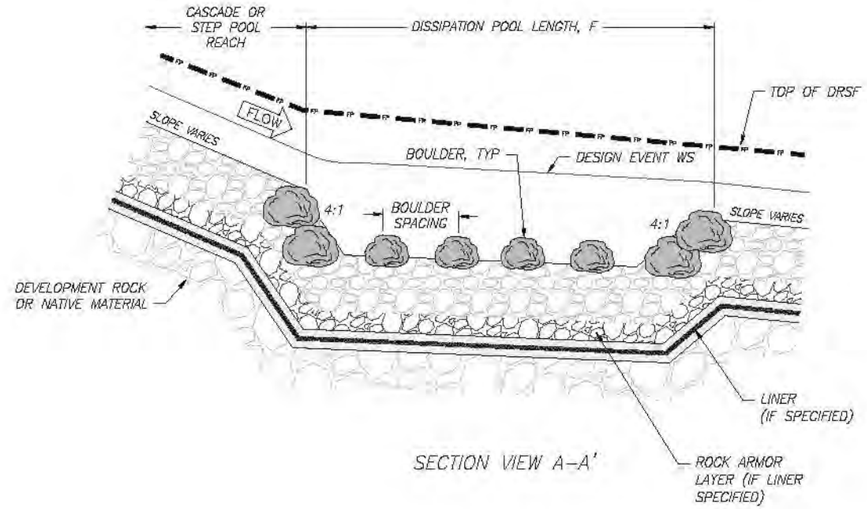
Drawing Name
Typical Details – 17

Drawing No.
D–17



PLAN VIEW



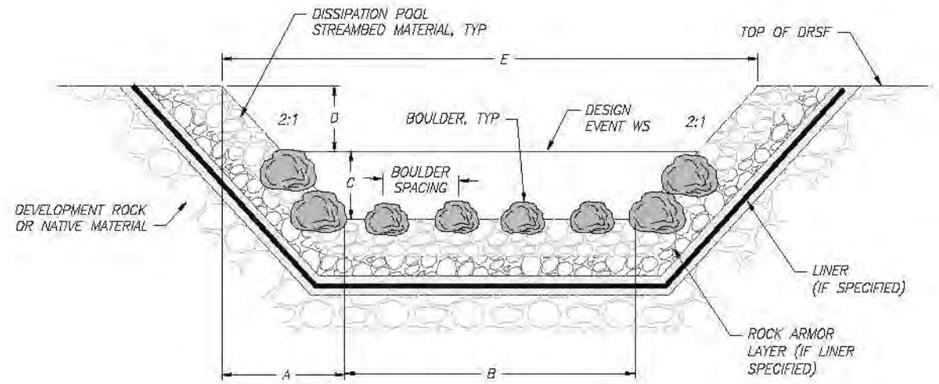
SECTION VIEW A–A'

ENERGY DISSIPATION BASIN DEFINITION TABLE

TABLE – A												
REACH ID	DESIGN EVENT	FLOW (CFS)	BASIN MATERIAL TYPE	BASIN MATERIAL THICKNESS (IN)	ROCK ARMOR MATERIAL TYPE	ROCK ARMOR MATERIAL THICKNESS (IN)	A (FT)	B (FT)	C (FT)	FREEBOARD, D (FT)	CHANNEL TOP WIDTH, E (FT)	POOL LENGTH, F (FT)
MC3	**100-YR**	**243**	**B1**	**4.0**	**A2**	**2.0**	**TBD**	**TBD**	**TBD**	**TBD**	**TBD**	**TBD**
FC2	**100-YR**	**43**	**B1**	**3.0**	**A2**	**2.0**	**TBD**	**TBD**	**TBD**	**TBD**	**TBD**	**TBD**
HC1	**100-YR**	**14**	**B1**	**3.0**	**NA**	**NA**	**TBD**	**TBD**	**TBD**	**TBD**	**TBD**	**TBD**
WE2	**100-YR**	**5**	**B1**	**3.0**	**A2**	**2.0**	**TBD**	**TBD**	**TBD**	**TBD**	**TBD**	**TBD**
WE3	**100-YR**	**15**	**B1**	**3.0**	**NA**	**NA**	**TBD**	**TBD**	**TBD**	**TBD**	**TBD**	**TBD**

NOTES

1. BASIN MATERIAL TYPES: B1 (D50 = XX")
2. ROCK ARMOR MATERIAL TYPES: A1 (D50 = XX"), A2 (D50 = XX").



SECTION VIEW B–B'

35 ENERGY DISSIPATION BASIN
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Drawing Name
Typical Details – 18

Drawing No.
D–18

BANK TREATMENT SCHEDULE – LEFT BANK

REACH ID	BANK TREATMENT	START STA	END STA	BRUSHLAYER		BRUSH LAYER PLANTING		LIVE STAKES		LIVE STAKES PLANTING	
				START STA	END STA	BRUSH LAYER THICKNESS (IN)	PLANTING DENSITY (# CUTTINGS PER L.F.)	START STA	END STA	PLANTING WIDTH (FT)	PLANTING DENSITY (SPACING)
MC1A	A	0+00	0+00	0+00	0+00	12	1	0+00	0+00	2	4' O.C.

BANK TREATMENT SCHEDULE TO BE COMPLETED IN A FUTURE DESIGN PHASE

NOTES:
1. SEE SHEET D-1 – TYPICAL DETAILS – 1 FOR BANK TREATMENT TYPES AND DETAILS.

BANK TREATMENT SCHEDULE – RIGHT BANK

REACH ID	BANK TREATMENT	START STA	END STA	BRUSHLAYER		BRUSH LAYER PLANTING		LIVE STAKES		LIVE STAKES PLANTING	
				START STA	END STA	BRUSH LAYER THICKNESS (IN)	PLANTING DENSITY (# CUTTINGS PER L.F.)	START STA	END STA	PLANTING WIDTH (FT)	PLANTING DENSITY (SPACING)
MC1A	A	0+00	0+00	0+00	0+00	12	1	0+00	0+00	2	4' O.C.

BANK TREATMENT SCHEDULE TO BE COMPLETED IN A FUTURE DESIGN PHASE

NOTES:
1. SEE SHEET D-1 – TYPICAL DETAILS – 1 FOR BANK TREATMENT TYPES AND DETAILS.

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Drawing Name
Typical Details – 19

Drawing No.
D-19

ZONE 1 CONTAINER PLANTING SCHEDULE

SCIENTIFIC NAME	COMMON NAME	PLANT TYPE	WETLAND INDICATOR STATUS	PLANT SIZE / PROPAGULE TYPE	PERCENT OF MIX, %	PLANTING SPACING (ON CENTER), FT
Elodea species (E. canadensis; E.Nuttalii)	waterweed	aquatic macrophyte	OBL	2.5 inch	25	2
Isoetes bolanderi	Bolander's quillwort	aquatic macrophyte	OBL	2.5 inch	15	2
Potomogeton alpinus	alpine pondweed	aquatic macrophyte	OBL	2.5 inch	15	2
Potomogeton epihydrus	ribbonleaf pondweed	aquatic macrophyte	OBL	2.5 inch	15	2
Ranunculus aquatilis	white water crowfoot	aquatic macrophyte	OBL	2.5 inch	15	2
Utricularia macrohiza	common bladderwort	aquatic macrophyte	OBL	2.5 inch	15	2
Total					100	

ZONE 2 CONTAINER PLANTING SCHEDULE

SCIENTIFIC NAME	COMMON NAME	PLANT TYPE	WETLAND INDICATOR STATUS	PLANT SIZE / PROPAGULE TYPE	PERCENT OF MIX, %	PLANTING SPACING (ON CENTER), FT
Carex canescens var. canescens	silvery sedge	graminoid	OBL	10 ci	10	3 ft
Carex lenticularis var. lipocarpa	lakeshore sedge	graminoid	OBL	10 ci	10	3 ft
Carex utriculata	beaked sedge	graminoid	OBL	10 ci	10	3 ft
Deschampsia elongata	slender hairgrass	graminoid	FACW	10 ci	20	3 ft
Equisetum fluviatile	water horsetail	fern ally	OBL	2.5-in	20	3 ft
Glyceria striata (G. elata)2	fowl mannagrass (tall managrass)	graminoid	OBL (FACW)	10 ci	20	3 ft
Juncus ensifolius	swordleaf rush	graminoid	FACW	10 ci	10	3 ft
Total					100	

ZONE 2 SEEDING SCHEDULE

SCIENTIFIC NAME	COMMON NAME	PLANT TYPE	WETLAND INDICATOR STATUS	PERCENT OF MIX, %	PLS, SEEDS/LB	PLS, LB/ACRE
Deschampsia elongata	slender hairgrass	graminoid	FACW	30	2,300,000	1.03
Glyceria striata (G. elata)2	fowl mannagrass (tall managrass)	graminoid	OBL (FACW)	40	1,600,000	1.97
Juncus drummondii	Drummond's rush	graminoid	FACW	15	17,000,000	0.07
Juncus ensifolius	swordleaf rush	graminoid	FACW	15	24,000,000	0.05
Total				100		3.12

ZONE 3 CONTAINER PLANTING SCHEDULE

SCIENTIFIC NAME	COMMON NAME	PLANT TYPE	WETLAND INDICATOR STATUS	PLANT SIZE / PROPAGULE TYPE	PERCENT OF MIX, %	PLANTING SPACING (ON CENTER), FT
Betula glandulosa	resin birch	shrub	OBL	D 40	10	6 ft
Calamagrostis canadensis var. canadensis	bluejoint reedgrass	graminoid	FACW	10 ci	10	3 ft
Deschampsia elongata	slender hairgrass	graminoid	FACW	10 ci	10	3 ft
Equisetum hyemale var. affine	scouring rush	fern ally	FACW	2.5-in	5	3 ft
Salix drummondiana	Drummond's willow	shrub	FACW	live stakes; D 40	20	3 ft; 4 ft
Salix geyeriana	Geyer's willow	shrub	FACW	live stakes; D 40	20	3 ft; 4 ft
Salix melanopsis	dusky willow	shrub	OBL	live stakes; D 40	20	3 ft; 4 ft
Senecio triangularis	arrowleaf ragwort	forb	FACW	10 ci	5	3 ft
Total					100	

ZONE 3 SEEDING SCHEDULE

SCIENTIFIC NAME	COMMON NAME	PLANT TYPE	WETLAND INDICATOR STATUS	PERCENT OF MIX, %	PLS, SEEDS/LB	PLS, LB/ACRE
Calamagrostis canadensis var. canadensis	bluejoint reedgrass	graminoid	FACW	25	3,800,000	0.52
Deschampsia elongata	slender hairgrass	graminoid	FACW	35	2,300,000	1.19
Glyceria striata (G. elata)3	fowl mannagrass (tall managrass)	graminoid	OBL (FACW)	20	1,600,000	0.98
Juncus arcticus ssp. littoralis (J. balticus)	mountain rush	graminoid	FACW	5	7,500,000	0.05
Juncus ensifolius	swordleaf rush	graminoid	FACW	5	24,000,000	0.02
Mimulus lewisii	purple monkeyflower	forb	FACW	5	20,636,363	0.02
Senecio triangularis	arrowleaf ragwort	forb	FACW	5	500,000	0.78
Total				100		3.56

ZONE 4 CONTAINER PLANTING SCHEDULE

SCIENTIFIC NAME	COMMON NAME	PLANT TYPE	WETLAND INDICATOR STATUS	PLANT SIZE / PROPAGULE TYPE	PERCENT OF MIX, %	PLANTING SPACING (ON CENTER), FT
Alnus incana ssp. tenuifolia	thinleaf alder	shrub/tree	FACW	D 40	20	6 ft
Calamagrostis canadensis var. canadensis	bluejoint reedgrass	graminoid	FACW	10 ci	10	3 ft
Cornus sericea (C. alba)	redosier dogwood	shrub	FACW	D 40	15	6 ft
Geum macrophyllum var. perincisum	largeleaf avens	forb	FAC	10 ci	10	3 ft
Lonicera involucrata var. involucrata	twinberry honeysuckle	shrub	FAC	D 40	15	6 ft
Picea engelmannii var. engelmannii	Engelmann's spruce	tree	FAC	D 40	10	8 ft
Ribes lacustre	prickly currant	shrub	FAC	D 40	10	6 ft
Salix drummondiana	Drummond's willow	shrub	FACW	live stakes; D 40	5	3 ft; 4 ft
Salix lasiandra	Pacific willow	shrub	FACW	live stakes; D 40	5	3 ft; 4 ft
Total					100	

ZONE 4 SEEDING SCHEDULE

SCIENTIFIC NAME	COMMON NAME	PLANT TYPE	WETLAND INDICATOR STATUS	PERCENT OF MIX, %	PLS, SEEDS/LB	PLS, LB/ACRE
Calamagrostis canadensis var. canadensis	bluejoint reedgrass	graminoid	FACW	30	3,800,000	0.55
Deschampsia elongata	slender hairgrass	graminoid	FACW	20	2,300,000	0.61
Elymus trachycaulus ssp. trachycaulus	slender wheatgrass	graminoid	FAC	40	160,000	17.44
Potentilla gracilis	slender cinquefoil	forb	FAC	10	1,700,000	0.42
Total				100		19.02

PLANTING ZONE NOTES:
1. SEE SEE DRAWING D-1 - TYPICAL DETAILS - 1 FOR PLANTING AND SEEDING ZONES ASSOCIATED WITH BANK TREATMENT TYPES.

Applied Science & Engineering
2449 S. Vista Ave. Suite B
Boise, Idaho 83705

MIDAS GOLD

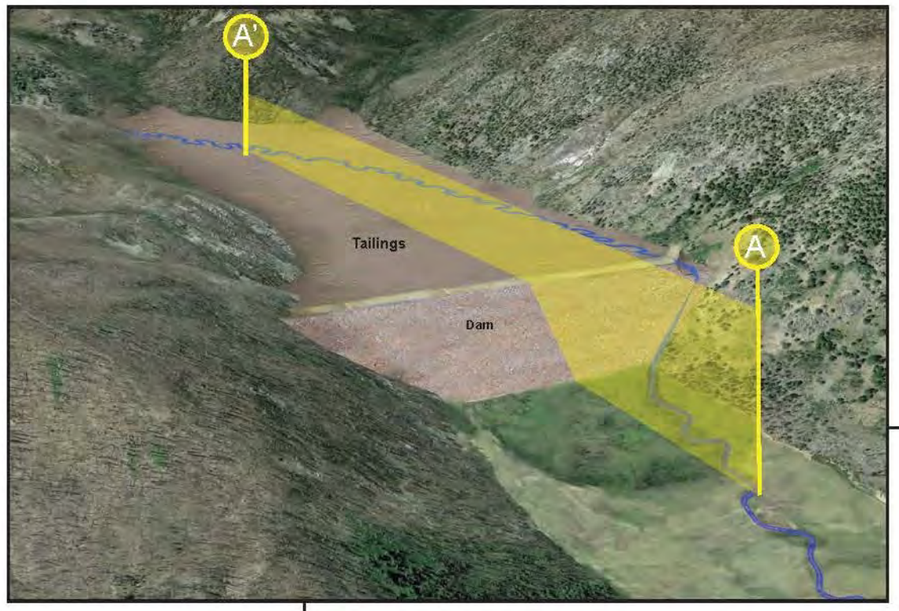
Stibnite Gold Project
Stream and Wetland Restoration Concept Design
Typical Details
Valley County, Idaho

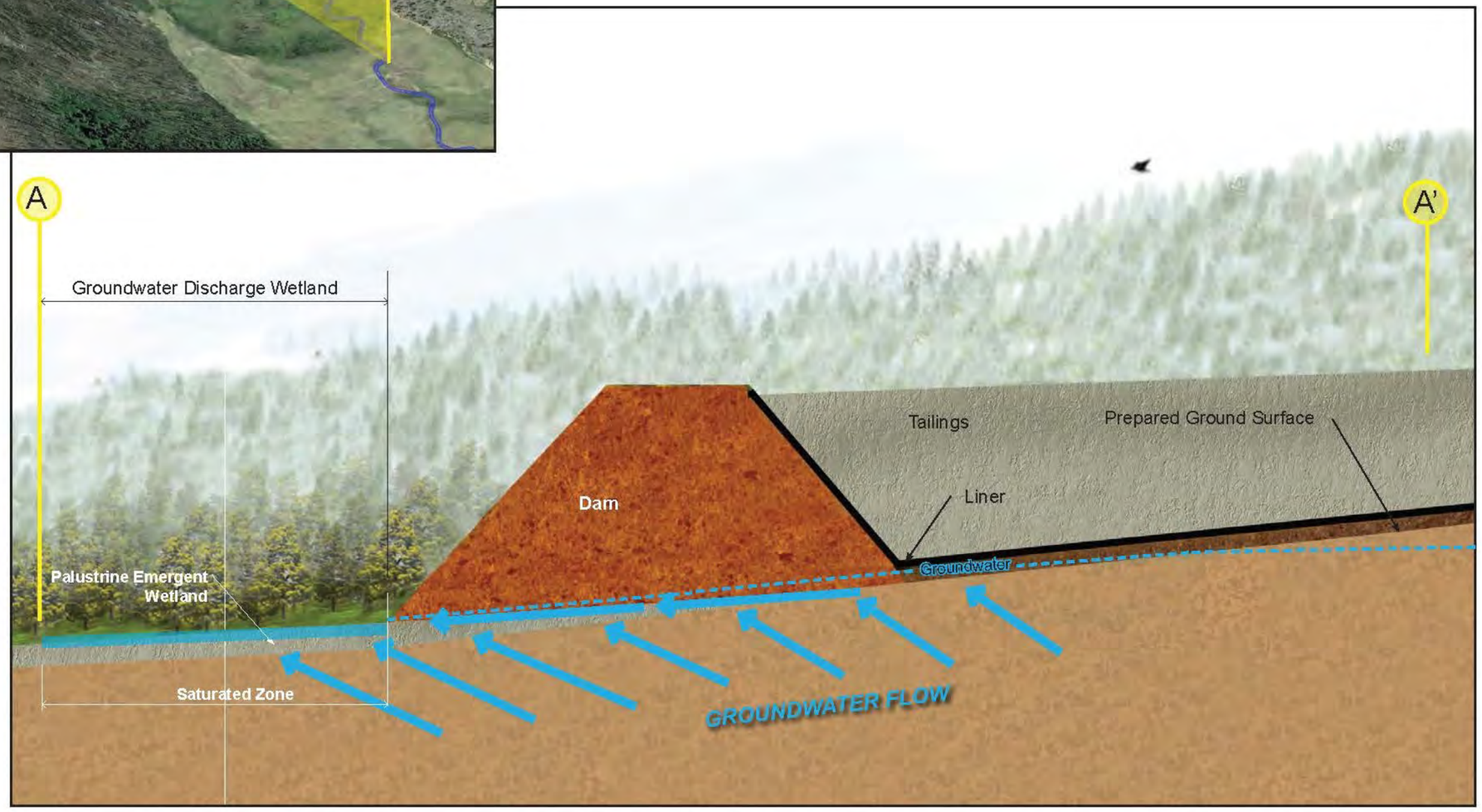
Draft

Date: Feb. 2019
Designed: JE, JY, MP
Drawn: JE, JY, MP
Checked: RR
Approved: ---

Drawing Name
Typical Details - 20

Drawing No.
D-20





TETRA TECH

MIDAS GOLD

Stibnite Gold Project

Stream And Wetland Restoration Concept Design

Wetland Details

Valley County, Idaho

Draft

Date:	Feb. 2019
Designed:	LC
Drawn:	JHD
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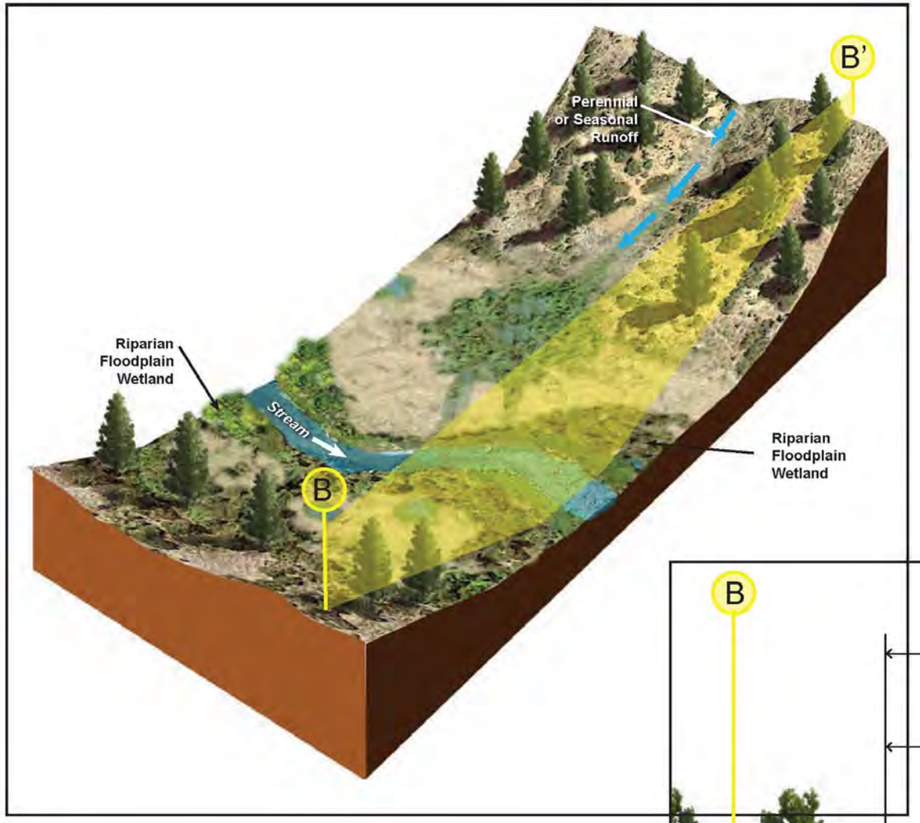
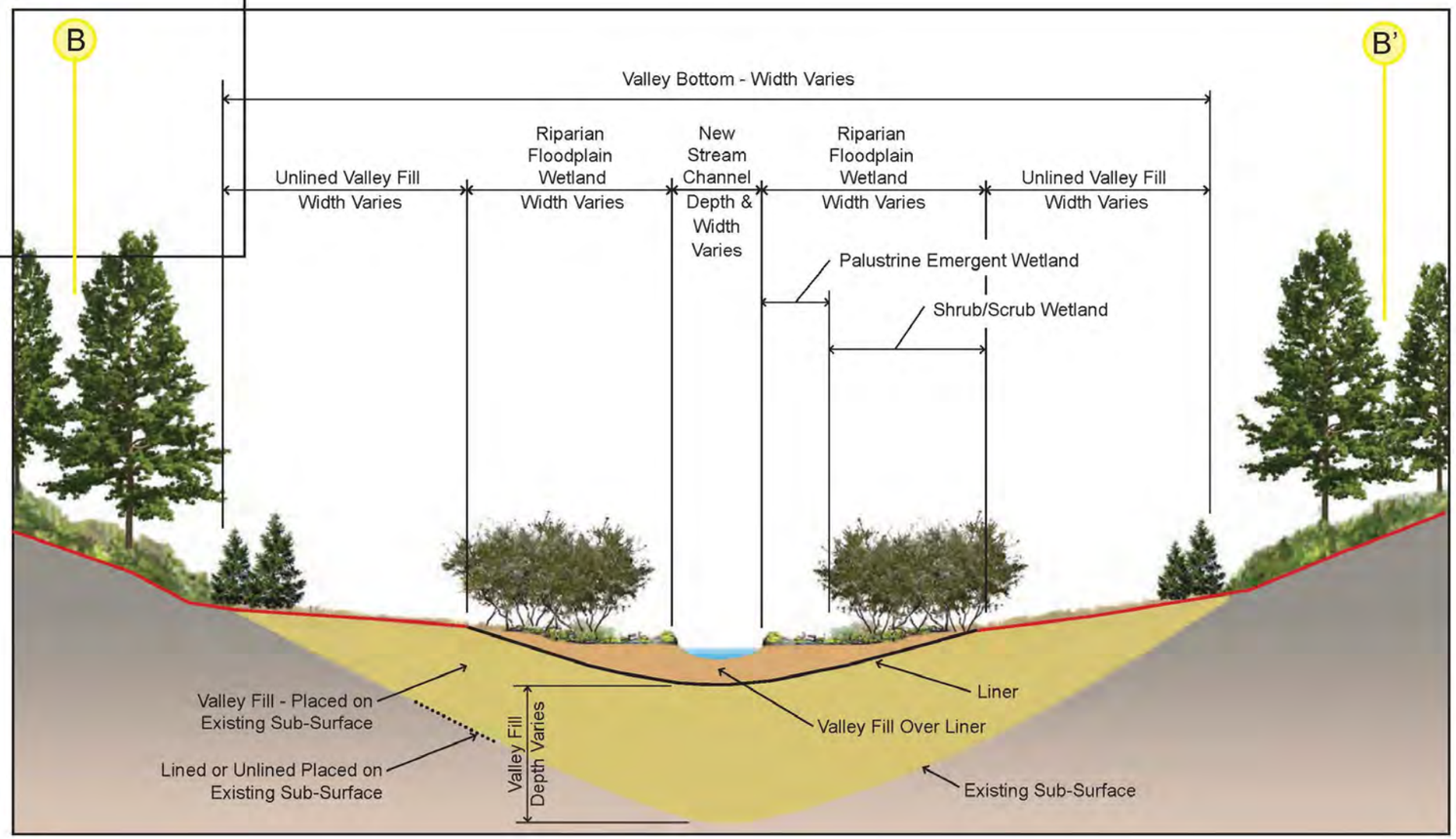
Drawing Name

Wetland Detail Sheet - 1

Drawing No.

D-21





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Wetland Details

Valley County, Idaho

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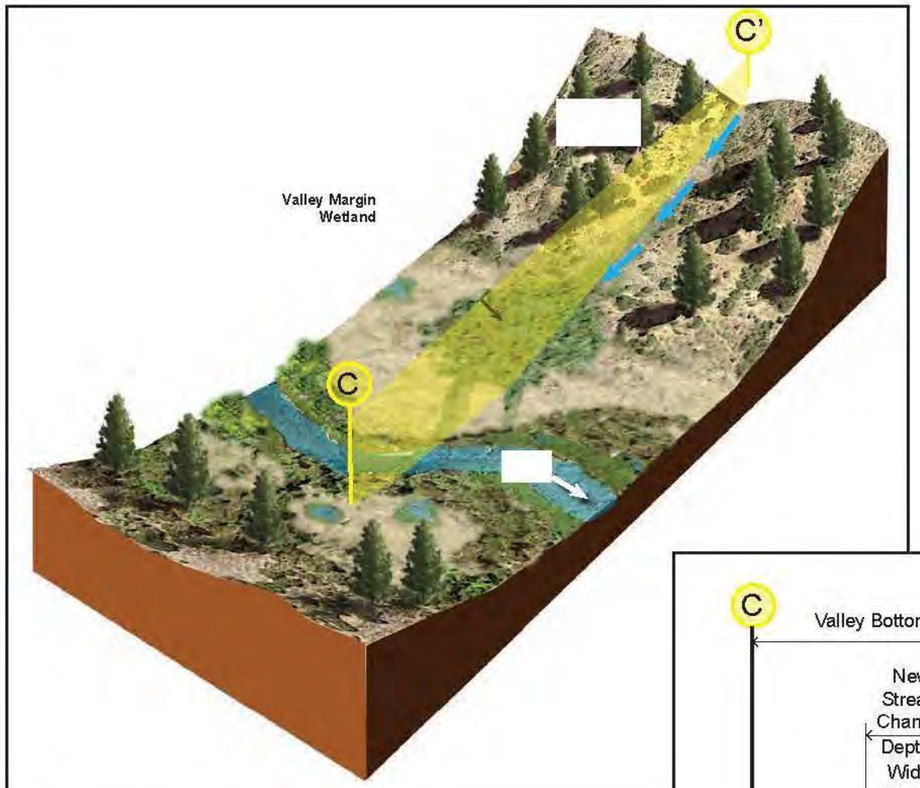
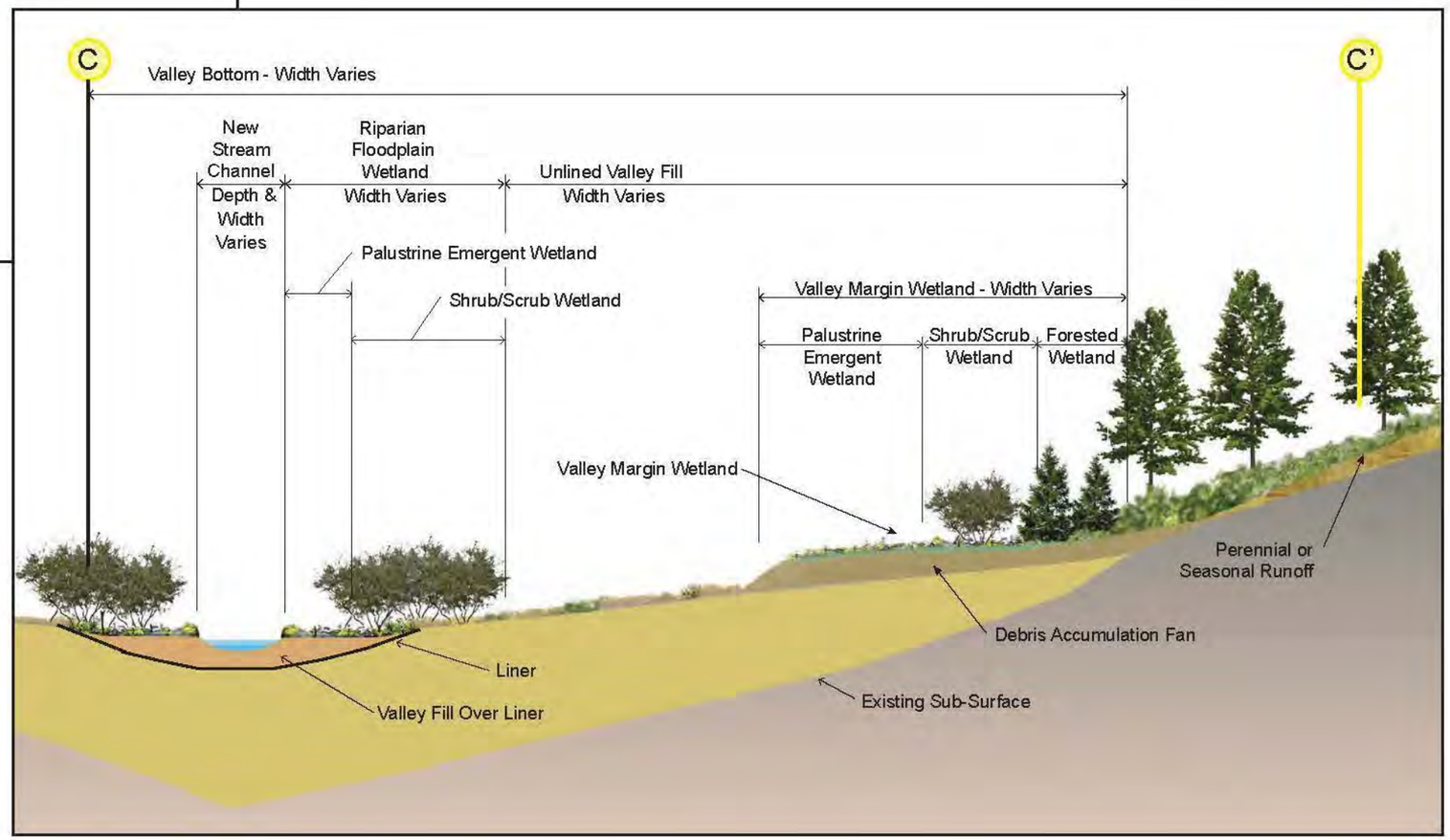
Drawing Name

Wetland Detail Sheet - 2

Drawing No.

D-22





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Wetland Details

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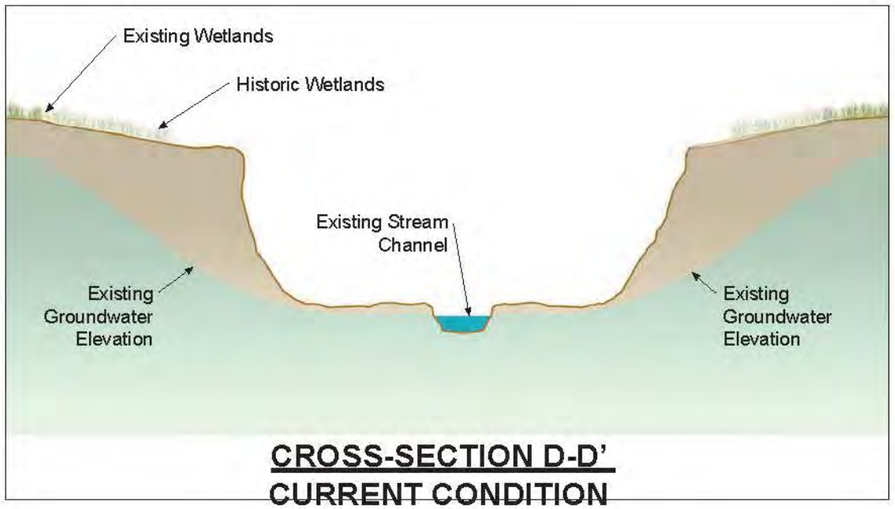
Approved:	

Drawing Name

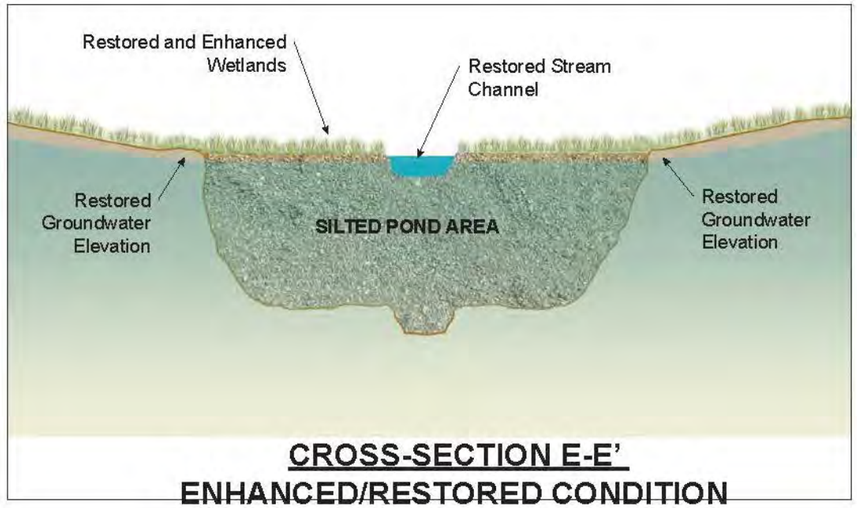
Wetland Detail Sheet - 3

Drawing No.

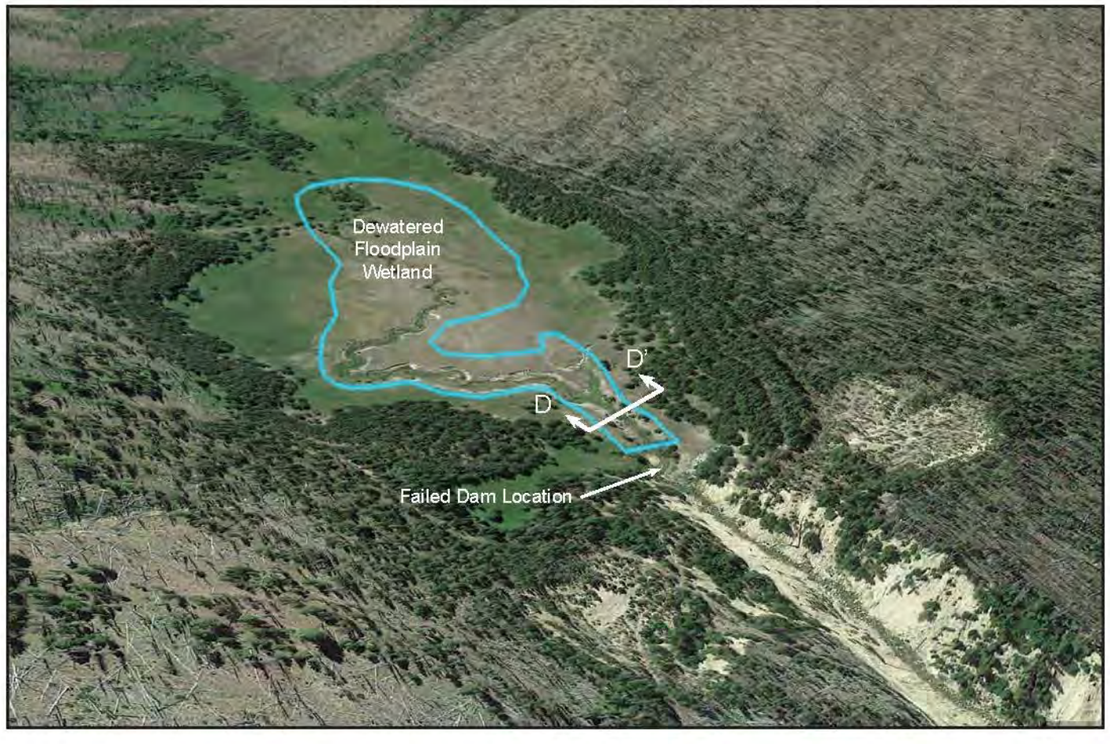
D-23



CROSS-SECTION D-D'
CURRENT CONDITION



CROSS-SECTION E-E'
ENHANCED/RESTORED CONDITION



TETRA TECH

MIDAS GOLD

Stibnite Gold Project
Stream And Wetland Restoration Concept Design
Wetland Details
Valley County, Idaho

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Drawing Name
Wetland Detail Sheet - 4

Drawing No.
D-24